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THE VILLAGE OF WINNETKA
WINNETKA, ILLINOIS

November 18, 1918

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THE VILLAGE OF WINNETKA
(Signed) H. L. Woolhiser,
Business Manager

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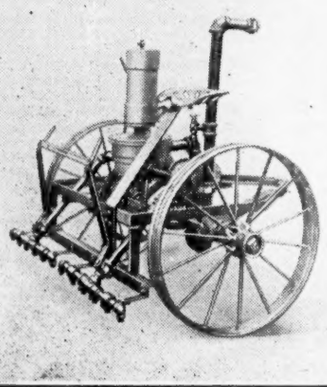

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SIMON BARR, *Assistant Editor*

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Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send to Municipal Journal and Public Works regularly their annual and special reports.

Information Bureau

The Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

Contents of This Issue.

UTILIZING SEWAGE SLUDGE

In almost every method of treating sewage that has been devised, the critical feature is the disposal of sludge. By the use of screens, sedimentation tanks or filters, the liquid can be relieved of as large a percentage of the suspended matter as may be desired, within reasonable limits. But the problem remains of disposing of the matter so removed, which in a year or ten years totals an appaling amount.

If the claims for certain methods that they produce a sludge that can be sold for fertilizer, or recover grease for which a market can be found, can be made good, those in charge of solving the sewage problems of our cities would be more than pleased. Their present aim, in most cases, is to get rid of the stuff at all without creating a nuisance or incurring too great expense.

There seems to be increasing probability, however, that one or more methods will be evolved for disposing of sludge more satisfactorily and at less cost than by any method now in practical use. Those that are being tried out seem to be falling less short of the expectations of their promoters than was the experience of a few years ago.

It is interesting to those on this side of the Atlantic, as well as in England, to learn that the British government is investigating the subject, as reported elsewhere in this issue. Also that the two plans that have so far appealed most to these experts are the recovery of grease by the use of acid (which has been tried out in England for two or three years), and the conservation of nitrogen in the sludge for fertilizer purposes rather than its dissipation by the process employed. The latter is claimed to be effected by the activated sludge process, the former by the Miles process, both of which have been described at length in this journal. It is hoped that valuable light on the subject will be furnished by the activated sludge plants now operating in this country and the acid process plant contemplated by at least one city.

FIELD SURVEYS OF WATER

The director of the Division of Sanitation of the State Board of Health of Minnesota, H. A. Whittaker, has reported that of 344 unsatisfactory water supplies in the state located by the board, laboratory analysis alone revealed eight per cent of them, but field surveys alone revealed forty per cent. That is, as a guarantee of the satisfactoriness of a water supply a sanitary field survey is five times as reliable as chemical and bacterial analyses.

The analyses are easier to make, they have their value and should not be omitted. But too many water superintendents send one or two samples of water a year to the state board of health, receive a report of "safe," and let it go at that. Such a report really applies to that particular sample only—an infinitessimal part of the water distributed by the system. Only a frequently renewed intimacy with the history of the water, such as would reveal possible sources of pollution, can be relied upon as a satisfactory guarantee of safety.

THE TORONTO DRIFTING SAND FILTERS.

Description of the Filter and Its Principle of Operation—Some Details of Operation—Variations in Turbidity Cause Difficulties—Bacterial Results Obtained—Policy of Operation.

Toronto, Ontario, in 1914-1917 constructed on Toronto island a mechanical filtration plant with several novel features, the principal of these being the use of the so-called "drifting-sand" type of filter. This filter was described in our issue of November 16, 1918. During 1918 it was operated in regular service purifying a part of the water of the city, the remainder of which is treated by a slow sand filter which has been in use for a number of years. The new filter plant has a capacity of sixty million gallons in twenty-four hours. The rate of filtration is 150 million gallons (here and elsewhere in this article imperial gallons are referred to) per acre per day. The two principles involved in its operation are the introduction of a coagulant without sedimentation and the necessity for there being a "drifting" as well as a stationary body of sand in the filter.

The latest data concerning this filter were contributed by Norman J. Howard, the bacteriologist in charge of the filtration plant laboratory, in a paper before the convention of the New England Water Works Association. He first described the plant, from which description the following most important features are abstracted.

DESCRIPTION OF PLANT

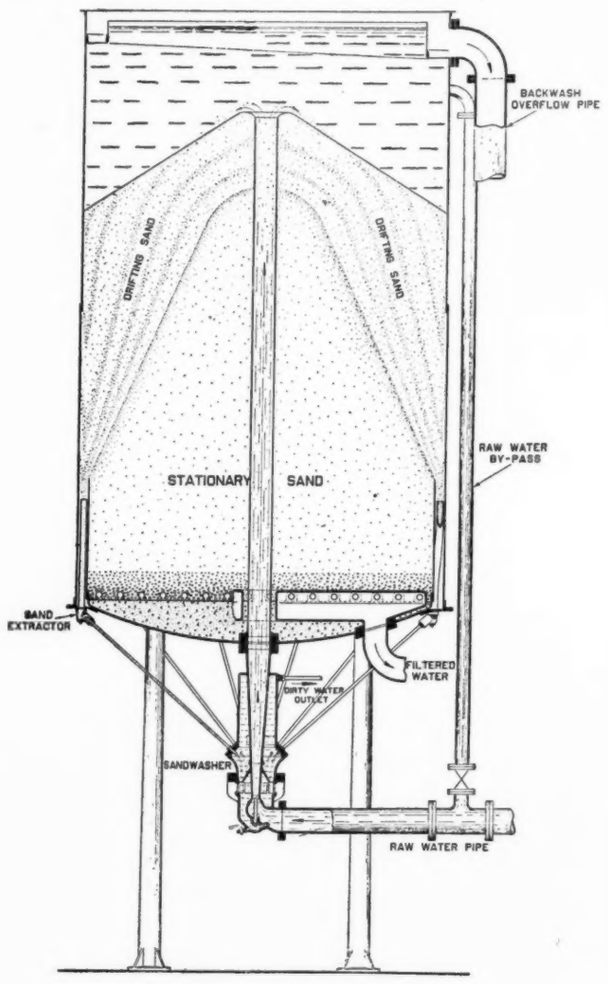
There are ten units, each with a nominal capacity of six million gallons per day (but a maximum rate of seventy-two million gallons must be maintained for a period of ten hours). Each is of steel, fourteen feet high and fifty feet in diameter and divided into thirty smaller units, which are nested together in two rings of eighteen and twelve units respectively. In the center of the filter is a cylindrical space 16⅔ feet in diameter, in which is placed the raw-water control balance. Each of the thirty units forms a separate quadrilateral unit with its sand extractors, sand washer, and filtered water collecting system. At the bottom of each filter, partly imbedded in concrete, is a cast-iron collector pipe for the filtered water, branching out from which are 1½-inch wrought-iron pipes with ⅜-inch holes drilled on the under side. On top of this collecting system is placed gravel in three grades varying from three-quarters of an inch to three-sixteenths of an inch, this gravel being ten inches deep. On top of this is nine feet of sand. No screens are used between the gravel and the sand. The sand has an average effective size of .375 millimeters and a uniformity coefficient of 1.6 to 2. The drifting sand is withdrawn from the filter by means of extractor pipes, through which the sand flows to the bottom of the filter unit into a sand washer, where the sand falls to the bottom through a current of raw water and thus is cleaned. The washed sand is picked up by the incoming raw water and enters the filter with the water.

The coagulant (sulphate of alumina) is introduced as the water flows to the filter, on the suction side of the pump. The water enters the filter partly through a standpipe placed vertically in the center of the unit, which delivers sand onto the filter from the top of the pipe, and partly through a by-pass. The sand so delivered forms a volcano-like cone. After operation has started, the sand in the body of this cone remains stationary, but immediately above the stationary sand moves the sand introduced by the incoming water. The rate at which the drifting sand is applied is determined by that of the raw water passing up the standpipe, which can be controlled, the balance of the water passing through the by-pass. It is found that the stationary sand forms a cone the slope of whose surface is about sixty-four degrees, while the cone of the drifting sand has a minimum slope of about thirty-two degrees. By causing the sand to drift across the path of the raw water, a large proportion of the impurities, including the hydrate of alumina and the bacteria which have been caught by the coagulant, are carried out with the drifting sand. The water then passes through the stationary sand, which finishes the purification.

The initial loss of head in the filters is six feet, which gradually increases to eleven feet, when the filter is backwashed. The length of run varies between one and seven days, according to the physical condition of the water and the amount of alum applied. The filters are washed by reversing the flow, water for this purpose being obtained from an elevated tank which gives a pressure of twenty-five pounds. Two hundred thousand gallons are used for washing the filter, the operation taking twenty minutes, after which the effluent is run to waste for twenty minutes. The amount of water used by the sand washer is two per cent and an additional one to two per cent is used for washing the filters and waste after washing.

OPERATION

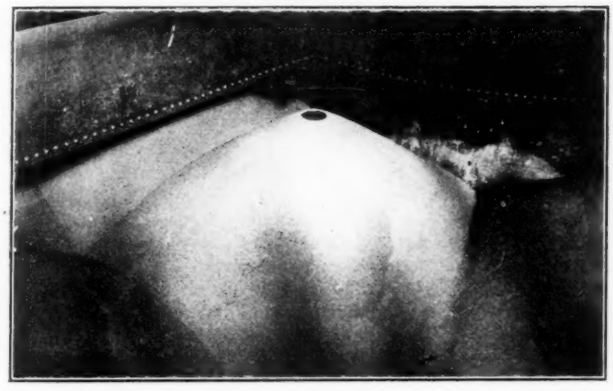
As this was a new idea, it was expected that there would be problems and difficulties, but these have proved to be in no case serious and have been overcome with few exceptions. In the early days the biggest problem was to get a high-grade sand. At present the sand is not quite uniform, having an effective size which varies between .35 and .4 millimeters. Sand scour has been the most troublesome problem. When the filters were first put into commission, the cast-iron throats did not wear as long as was expected, and they were relined, first with extra heavy black iron pipe and finally with similar pipe carbonized. Porcelain was found unsuitable and experiments with rubber are now under way. A modified sand washer base has been tried which greatly reduces the scour, and a number are now being installed.



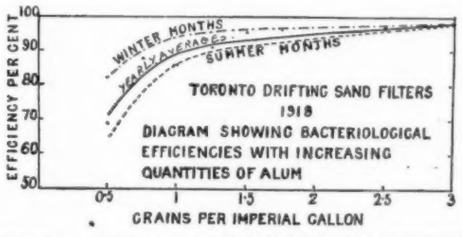
DRIFTING SAND FILTER.

It was found that Lake Ontario waters varied greatly in pollution and the purification effected under apparently the same physical conditions varied from time to time. Turbidity did not seem to affect the purification, except that it was necessary to increase the alum to secure clarification. In the winter months polluted water requires at least 1½ to 2½ grains of alum to obtain a satisfactory effluent. During the summer months it was found necessary to apply at least 2½ grains to a polluted water which often was free from turbidity. Water slightly polluted required about one grain per gallon. Raw water appears to coagulate slightly better in the summer months when the water temperature exceeds fifty degrees, but the final purification effected was lower than in the winter when the temperature ranged between thirty-three degrees and forty-six degrees. The microscopic content and that of the bacteria increased greatly in the summer months.

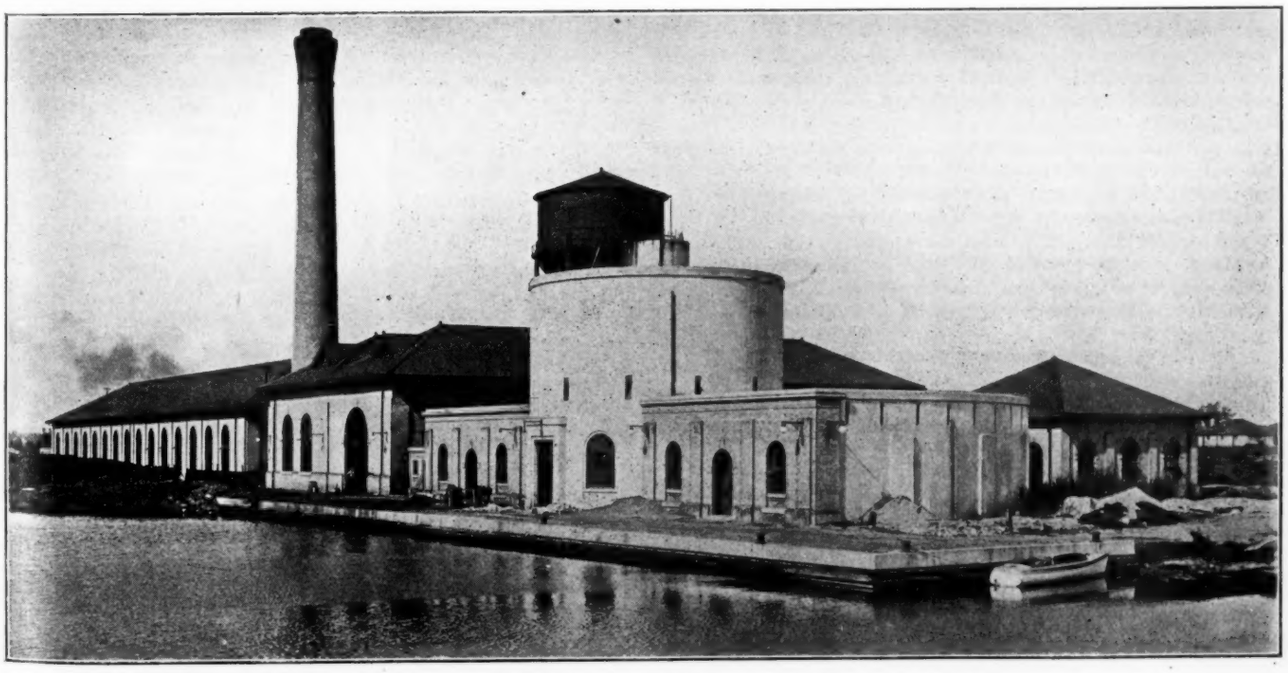
OPERATING GALLERY OF FILTER HOUSE.



The raw water is subject to very rapid changes, frequently becoming heavily polluted after less than eight hours' change in meteorological conditions. This makes treatment exceedingly difficult, as a sudden increase in pollution is likely to find an insufficient quantity of alum being applied and the efficiency of the plant is thus impaired.



EFFECT OF SIZE OF ALUM DOSE ON EFFICIENCY.



VIEW OF BUILDING HOUSING THE TORONTO FILTRATION PLANT.

Mr. Howard presented tables showing the results of the treatment during 1918, dividing the year into two periods, from December to May and June to November, because of the difference of action of the filter in the summer and winter months respectively. Three results are excluded in making up the averages because an insufficient quantity of coagulant was being applied at the time the sample was taken owing to a sudden change such as that just referred to. Excluding these three records, the average number of bacteria per c. c. on standard agar was 303.6 in the raw water and 34.7 in the filtered, with an average reduction of 88.4 per cent. The indicated number of B. coli in one c. c. were 6.08 in the raw water, and 0.22 in the filtered, with an average reduction of 96.4 per cent. The chlorinated water showed an average bacterial count of 1.72 per c. c., while only two samples out of 1,900 examined showed the presence of B. coli in one c. c.

CONCLUSIONS

Conclusive evidence has been forthcoming from experiments and borne out by actual results, that Lake Ontario water can not be bacteriologically purified to a high degree by mechanical filtration, when only an average dose of aluminum sulphate of one grain per Imperial gallon is applied. But the actual purification effected by the drifting sand filters in 1918 was on an average application of 1.027 grains per Imperial gallon, and the results obtained on such a small amount are satisfactory. It has been clearly demonstrated that if a higher dose of alum was applied, a corresponding degree of purification was obtained. The economical question, however, had to be taken into consideration on account of the enormous cost of aluminum sulphate, and when it is considered that during periods of high pollution as much as 2.5 grains per gallon was applied, a definite economical as well as a practical policy of operation had to be adopted.

The summary of conclusions formed are as follows:—

1. That Lake Ontario water can be treated effectively by mechanical filtration.

2. During the year the composition of the water appears to undergo two distinct changes, which make the treatment of the water difficult.

3. That in the summer months more coagulant is necessary than in the winter period.

4. That the purification effected by the drifting sand filters during 1918, upon an average dose of one grain per gallon of alum, was satisfactory.

The plant is operated by the Department of Works, Commissioner R. C. Harris being the head of the department, with A. U. Sanderson as superintendent of the plant. The filtration laboratories, under the Department of Health, determine the amount of coagulant necessary. An excellent understanding has always existed between the two departments and close cooperation on the plant has made its operation a simple matter. Our policy of operation as at present defined is:—

1. Treat raw water at all times with sufficient aluminium sulphate to clarify the effluent effectively.

2. Obtain as high a bacterial efficiency as possible on an average dose of one grain per Imperial gallon.

3. Leave final sterilization to chlorine.

In conclusion, I would quote the last paragraph from the official report on drifting sand filters, October, 1918, by Col. G. Nasmith and the writer, which reads as follows:—

The decision we arrived at when the tender for the mechanical plant was first let, "That our former conception of a filtration plant was undergoing a material change; that sterilization of the water was the vital thing, from the public health standpoint, but that a filter was essential to clean the water, to keep the sand and dirt out of the water supply, and thereby prevent the wear and tear of machinery valves, taps, etc., as well as prepare the water for efficient sterilization; and that for a great portion of the year only a fraction of a grain of aluminium sulphate in conjunction with a slight amount of chlorine would be essential for filtration, thereby resulting in a great saving in the cost of operating," has been generally confirmed as a sound one, not only by ourselves, but by sanitarians in civilian and army work the world over.

SIZES OF METERS

Practice of the Interstate Water Company of Danville in Fixing Meter Sizes—Smaller Sizes Preferable.

In a discussion of the subject of meters before the Indiana Sanitary and Water Supply Association, W. Seilhymer, superintendent of the Service Department of the Interstate Water Co. of Danvill, Ill., gave the following information concerning the practice of that company in fixing meter sizes.

"The matter of oversizing of meters was considered by the Interstate Water Co. years ago. Owing to the small minimum that applies to all sizes alike it was compelled to install as small a meter as would possibly supply the demand. We find that a small meter (⅝ and ¾) will supply from ten to fifteen thousand cu. ft. per month for a period of about two years, with one or two trial tests in the meantime. After these tests it may be necessary to replace the disc and possibly the intermediate train gear, after which the life of the meter is practically renewed.

"We are getting more uniform readings on the smaller size meter, even when it is only one size smaller than the service. This is more noticeable on the smaller laundries and garages where the ¾-inch was installed in place of the 1-inch or larger. I believe in using the smaller size meter, considering at all times the legitimate needs of the consumer, as it decreases the first cost of the installation and adds to the monthly revenue by the more accurate registration of all the smaller flows that naturally will not be registered by a larger meter. In this way a company may be assured a more accurate registration than by granting most any size meter asked for by the consumer, who perhaps has the word of some architect who is not aware of the pressure carried at all times or by some plumber who is not qualified to speak on the matter. In all cases where larger meters have been asked for and the company exercised its right to determine the size, in no single instance has it been compelled to change the installation. It is a well understood fact between the company and the consumer when this kind of installation is made that if the service is not satisfactory we gladly give him the increased meter at no expense or inconvenience to him.

In connection with this is an instance of the setting of a 2-inch meter on a 12-apartment building that was designed and built by a foreign firm of contractors who installed a 2-inch service and a 2-inch meter was placed. The monthly readings were very uniform for a period of a few years, then the prop-

BACTERIAL RESULTS

Showing the variation that occurs in the efficiencies in the winter and summer month periods.

Average number of bacteria per cc. in the raw and filtered water, with percentage reduction.

Showing number of days that B. coli was present in raw and filtered water, with percentage reduction.

Month.	Raw Water.	Filtered Water.	Raw Water. 100	10	1	.1	.01	.001	Filtered Water. 100	10	1	.1	.01
WINTER PERIOD.													
December	534.39	33.35	25	23	18	11	5	1	25	16	9	1	0
January	42.23	3.31	22	11	8	1	0	0	13	7	0	0	0
February	7.42	1.21	24	15	2	1	0	0	22	8	2	0	0
March	42.98	3.24	23	17	7	3	0	0	19	10	3	0	0
April	73.44	5.62	24	19	13	6	0	0	23	10	6	0	0
May	28.73	5.62	25	15	5	0	0	0	24	13	2	0	0
Removal 92.8%.			Total Removal 97.8%.										
SUMMER PERIOD.													
June	108.54	11.38	21	14	2	1	0	0	18	4	0	0	0
July	97.08	19.92	22	14	4	1	0	0	24	14	3	0	0
August	653.2	67.31	26	24	15	4	0	0	26	23	9	0	0
September	738.6	128.80	24	19	11	5	0	0	24	16	10	0	0
October	1,382.46	290.5	26	21	15	9	0	0	26	18	7	2	0
November	779.6	33.32	24	13	7	1	0	0	25	19	7	0	0
Removal 84.1%.			Total Removal 75.8%.										

erty changed ownership and about this time we were short on the larger sizes of meters and it became necessary to have a 2-inch meter, and having none in stock it was removed and in its place a 1-inch disc meter was set which increased the next five months registrations over the preceding five months from 61,000 cu. ft. to 94,000 or about $6.84 in the monthly bills, and all this without a protest from the consumer.

A 6-inch proportional meter was replaced by a 4-inch meter where the use was varied from nothing to several thousand cu. ft. per month, the 4-inch increased the monthly consumption more than 10% and this service has never dropped to the minimum since the installation of the 4-inch meter.

The replacing of a 4-inch piston meter on a R.R. tank by a 3-inch meter of the same kind increased the revenue almost 25% the first month. The 4-inch meter was tested on low flow after being taken out and it was found that it was not registering the lower flows, such as occur so frequently in this kind of delivery. The meter was all right on the larger flows.

Regarding the testing and repairing of meters, will say that the Illinois Utilities Commission makes it mandatory on us to test all ⅝-inch meters after a delivery of 100,000 cu. ft. or at the end of ten years, providing that the meter is not tested on the demand of the consumer who may, if the meter has not been tested in the last twelve months, demand a test that he is entitled to free of cost; if the meter has been tested in this time and the consumer wants a test, same will be made on his request and by depositing $2.00 with the company. In case the meter tests within the legal limit, as it invariably does, the fee of $2.00 remains with the company to pay for the test. In almost all cases of request tests the consumer seems satisfied, especially if he is shown the internal mechanism and the working of the meter and is advised how to determine if he has any leakage or his attention is called to the requirements of his premises.

CRENOTHRIX REMOVAL BY CHLORINE

The removal of crenothrix from iron-bearing waters was the subject of a paper before the Indiana Sanitary and Water Supply Association by W. F. Monfort, consulting engineer of St. Louis. Experiences with crenothrix led him to conclude that:

"Filtration of water supplies infected with crenothrix removes organic matter, which is probably the essential foodstuff of the organism. Iron removal is probably incidental; carbon dioxide removal may be either partial or total; both are believed to be non-essential to the life and growth of crenothrix.

"The destruction of crenothrix and accompanying putrefactive bacteria by the germicidal action of chloramine (NH_2CL) or chlorine before filtration facilitates iron removal, and insures the supply thus treated against subsequent development and putrefaction of crenothrix.

"A practical test through a period of more than a year has shown 4.5 pounds of chlorine per million gallons of applied water effective in clearing a seriously infected system of filters, reservoirs, mains and service pipes of all accumulations, rendering the water free from taste, odor and color. The iron content is reduced to 0.1 part per million."

The feature of special interest is the conclusion that crenothrix does not require iron or carbon-dioxide but does require organic matter in the water; and that removal of iron does not prevent after-growth of crenothrix. Also that the odors caused by crenothrix are due to putrefactive bacteria which act upon the dead crenothrix. This opinion was based upon experiences such as that at Superior, Wis., where slow sand filters eliminated crenothrix, which did not reappear in the effluent even when the water was not aerated; (although aeration facilitated the operation of the filters). Presumably, bacterial changes occurred in the schmutzdecke and the sand occasioned a change in the organic matter unfavorable to the later growth of crenothrix.

The "practical test" referred to was conducted during 1918 and 1919 at the plant of the Champaign-Urbana Water Co., where 4.5 pounds of chlorine per million gallons was applied to well water before filtering. The manager of the plant, Mr. Amsbary, said: "The crenothrix growth had possession of the filter beds, rendering them inefficient; the reservoirs were foul with it, requiring frequent cleaning. The distribution system was supporting its proportion. Since pipes were stopping up all around the city, the situation was serious indeed. The use of chlorine, introduced into the raw water as it enters the filter beds, had an immediate effect on the crenothrix, causing it to disappear, and since its use began, we have been free of the pest. The filter beds are easily kept sweet and clean; efficiency 90%, and no growth can be detected in the basins or distribution system. It has been a great relief, as complaints which were numerous before its use, have entirely ceased since chlorine has been used."

Mr. Amsbary's reference in the phrase "efficiency 90%" is to the per cent. of iron removal from 2 parts per million in the raw water to about 0.1 p.p.m. in the filtered effluent, which is rather better than the average of earlier results here.

The filter beds, which are supplied with fine sand, show a reddish film when drawn down, but filaments of the organism formerly so persistent are not found. This seems to indicate that chlorine treatment is efficient in preventing growth of this and its attendant bacteria. Upon scraping away the top ¾ inch of fine sand, there was found fresh, uncolored, unmatted sand, indicating that iron removal was occurring at the surface only.

RESURFACING A CONCRETE PAVEMENT.

Concrete bridge floors on two steel bridges belonging to Tioga County, N. J., were resurfaced by a method that might, it would seem, be applied to roads also. The original floors were concrete slabs 3 inches thick resting on the steel floor members, with expansion joints 18 feet apart. They carried unusually heavy traffic, largely freight for nearby coal mines, and after seven years were in urgent need of repair. How these were made is described in "Concrete Highway Magazine" by James Crawford, commissioner of Tioga county.

The concrete was thoroughly swept to remove all dust, and washed clear. There was then applied to the entire surface a 5 per cent. solution of hydrochloric acid to remove the cement coating from the aggregates. After stopping the action of acid by thorough washing with clean water, there was applied a thin wash of cement grout over the entire surface, immediately followed by a 2-inch layer of concrete.

Clean hard trap rock, uniformly graded from ¼ to ¾ inch, was used as coarse aggregate. This was mixed with clean, hard sand and cement in the proportion of 2½ sacks cement, 1 cubic foot of sand, and 5 cubic feet of trap rock. Just enough water was used to make the batch plastic and workable. No joints were placed in the resurfacing layer. As a result, hair line cracks appeared within a month or so immediately above the old expansion joints. These cracks form a straight line across the pavement and have shown no indications of developing rounded edges or other damages.

After two years of use this work was carefully examined and showed no sign of broken bond or cleavage where old and new concrete join, no cracks except the hair line ones above the old expansion joints, nor any other evidence of wear from the regular heavy traffic to which exposed—in fact, the job may be regarded as satisfactory in every way and the methods used can be recommended as successful practice for similar conditions. The surface is as even and regular as when finished.

PAVING NORTH CAROLINA STATE ROADS.

W. S. Fallis, state highway engineer of North Carolina, has issued a "notice to contractors" under date of October 11th, relative to the "types of road surfacing preferred by the state." In this he says: "We feel that it is due the contractors that are bidding on our work to make perfectly clear the attitude of the State Highway Commission as to this matter.

"The following types of surfacing all complying with our standard specifications will always be on an equal basis; Plain Concrete, Warrenite, Topeka and Willite. Any responsible contractor bidding low on either of these types will be given

the work regardless of the type on which the low bid is made. This notice is intended to include all State lettings after this date.

"This is to assure all who bid on the types named above, that the party who bids low on either type, concrete or asphalt, will be awarded the work."

BRIDGEPORT'S SEWAGE SCREEN AND PUMPING STATION

Description of Underground Station, Disc Screen and Centrifugal Pumping Plant Now Under Construction.

By JAMES A. McELROY *

In a previous article† an account was given of the studies made under the direction of the Paving and Sewer Commission of the City of Bridgeport to determine the most appropriate and economical method of sewage disposal for this city. The result of these investigations led to the adoption of the fine screen method of treatment.

Work was started about the first of the year on the construction of the combined treatment plant and pumping station for the Western Sewage District. This plant was designed for an ultimate capacity of 35,000,000 gallons per day, dry-weather flow. At present, equipment to handle two-thirds of that quantity is being installed.

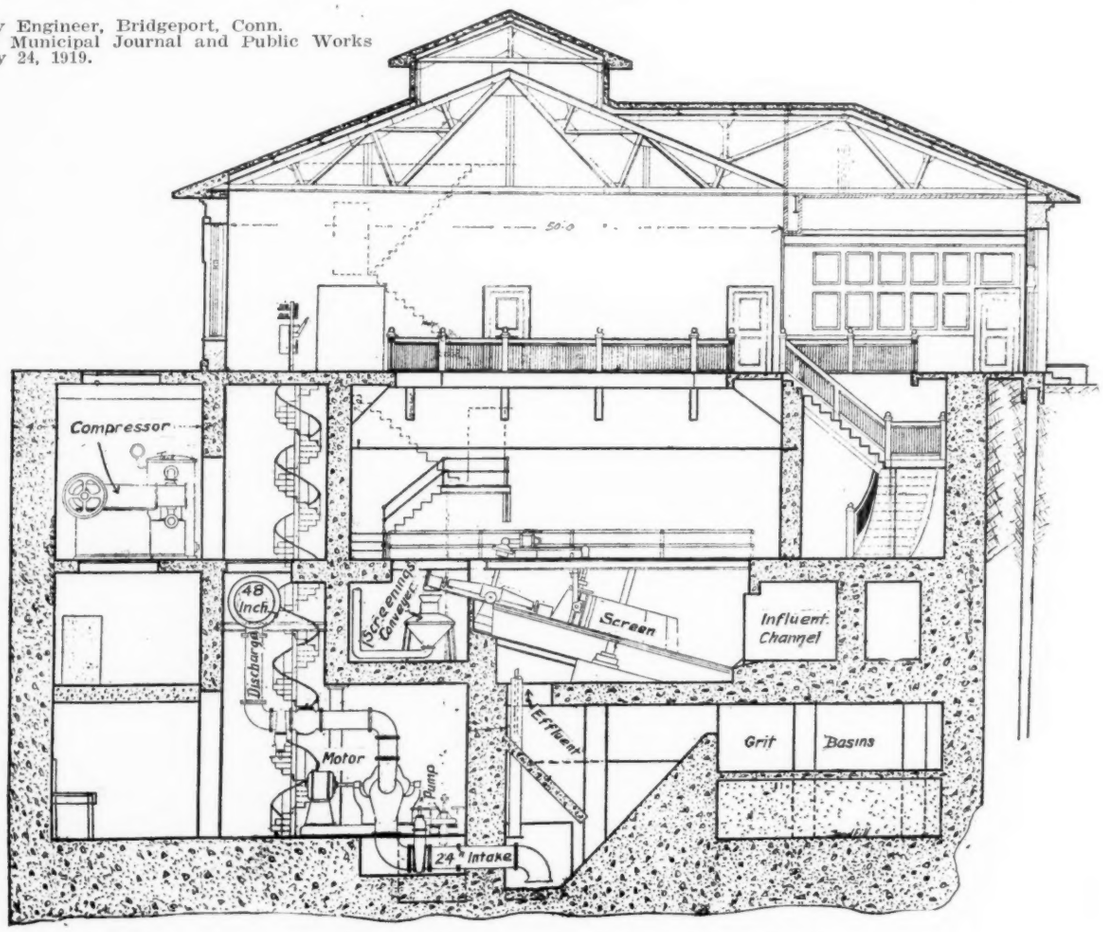
The sewage is carried through a 72-inch interceptor to the pumping station, located on the water front at the foot of Bostwick avenue. The present contract calls for 300 feet of 72-inch sewer from the street into the station, a 72-inch automatically operated sluice gate, the combined pumping station and treatment plant, with all equipment, a portion of the outfall including a venturi tube and a 60-inch electrically operated gate valve.

The sub-structure is a reinforced concrete caisson, 80 feet inside diameter and 45 feet deep. The cylindrical shell forming the outside wall of the caisson is constructed of a series of rings 10 feet high. The rings were cast above ground and after the concrete in each ring had properly set, the forms were removed and the ring sunk until the top was approximately a foot above ground. The forms were then re-assembled and the next section cast. When the caisson had reached the predetermined depth, the bottom was placed under water. After the concrete bottom had set the caisson was unwatered, the bottom made tight and finished to a surface. This part of the work has been completed, and the partitions, walls, piers, beams, and floor slabs will next be built. The superstructure will be rectangular in shape and constructed of reinforced concrete, tapestry brick, and stone trimmings, with a French red tile roof. The work of construction will be described in another article after the structure has been completed.

The sewage from the interceptor will flow through the sluice gate to a bar screen at elevation 100, thence through a concrete channel to the screens. The screened effluent will flow over an adjustable weir to the sump at elevation 80, then be lifted by the pumps to the force main at elevation 105.

The flow to each screen will be controlled by a specially designed swing type diversion gate. This gate is constructed of cast iron and is operated and controlled by

*City Engineer, Bridgeport, Conn.
†See Municipal Journal and Public Works for May 24, 1919.



SECTION THROUGH SCREEN AND PUMP HOUSE.

means of worm gearing and hand wheel. All wearing and bearing parts are bronze mounted.

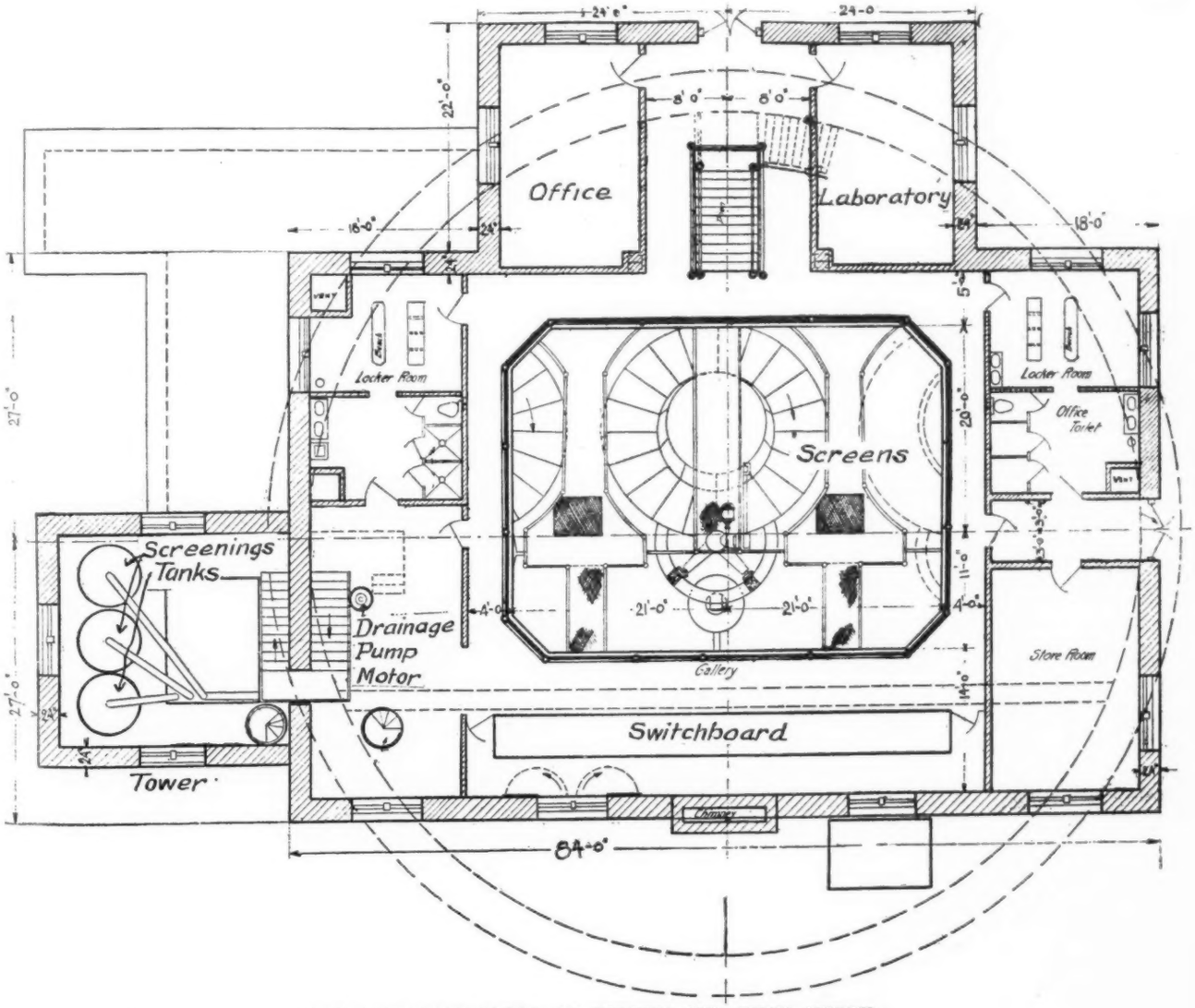
The plant is designed for three Sanitation R. W. screens each 22 feet in diameter, two of which will be installed under this contract. The special feature of this process of sewage treatment is the Riensch-Wurl rotating screen disc. The device consists of a circular disc 22 feet in diameter inclined at an angle of 15 degrees to the horizontal. A truncated cone, the base of which is 12 feet in diameter is centrally mounted on the disc. Removable manganese bronze screen plates are fitted to the disc and cone surface. These plates are perforated with rectangular slots 2 inches long by 3/64 of an inch wide. The lower portion or toe of the screen disc is set at the elevation of the invert of the influent channel. The angle or slope of the screen disc is such that the maximum high water level of the sewage will be below the top of the cone, and approximately 1/3 of the screen disc will be above water at all times. The screenings are carried on the disc, and are swept off the surface by six revolving cylindrical brushes. These brushes are carried by and rotated on a cast steel spider mounted on a shaft parallel with the main disc shaft. The surface of the cone is cleaned by a vertical rotating brush of the same general design as the disc brushes. The brushes consist of cylindrical bodies made of aluminum, the outer surfaces of which are drilled and the holes counter-bored, into which wild-hog bristles are wire drawn.

The sewage flows against the screen, which is constantly slowly rotating on its axis (approx. ½ r. p. m.), the effluent or liquid passing through the screen to be discharged into the pump sump. The screen surface retains the suspended solids which are gently raised out of the flow and removed from the plates by the brushes and deposited in the hopper of a screenings-conveyor system. From this hopper the screenings are conveyed to storage tanks, each of which has a capacity of five cubic yards.

From these tanks the screenings will be loaded into tank wagons and hauled to the city farm, where they will be mixed with stable manure and composted by placing alternate layers of screenings and stable manure or dirt, each layer being approximately 4 inches deep.

The screenings will be conveyed from the hopper to the storage tanks by a pneumatic system, which is a closed system and is very effective and sanitary as it obviates the unsightly handling of the same in open cans or on conveyor belts.

The screens will be driven by electric motors located on the operating bridges and directly connected to the driving mechanism by means of a centrifugal clutch



PLAN OF MAIN FLOOR OF SCREEN AND PUMP HOUSE.

coupling and worm gear. All the bearings on the screen will be lubricated from a central lubricating system located on the bridge and easily accessible to the operator. The motors will be controlled by push buttons located on the operating bridge and on the switchboard.

Each screen chamber will be connected to the pump sump by a specially designed concrete channel, through which the effluent from the screen flows. To regulate the loss of the head through the screens, a specially designed weir-type sluice gate will be installed at the entrance to the effluent channels.

When the flow is light and only sufficient for one screen, the influent and effluent gates of the idle screen will be closed, and the screen pit drained and cleaned. A covered manhole provided with a metal ladder will be located in the floor and on the flow side of the effluent gate for easy inspection of the gate and access to the screen pit.

The pumping equipment or main pumping unit will consist of two 20-inch horizontal double-suction volute centrifugal pumps, each having a normal capacity of 15 million gallons per 24 hours, and two 15-inch centrifugal pumps, each with a normal capacity of 8 million gallons per 24 hours. These pumps will be direct connected to electric motors by means of a flexible coupling and will discharge the screened effluent through a 60-inch discharge main into Long Island Sound. The main pump motors will be controlled and regulated by floats actuated by the water in the pump sump. The floats are adjustable and electrically connected to solenoid switches and automatic motor starters mounted on panels of the main switchboard.

A venturi tube is to be installed in the outfall to measure the entire flow through the plant; the graduated dial and recording chart and register for the venturi to be mounted on one of the main switchboard panels. A 60-inch electrically operated gate valve will be installed in a gate house built at the discharge end of the venturi tube.

The main switchboard will control all the electrical apparatus and lighting circuits of the entire plant. It will be located on the main floor and consist of 13 marble panels 90-inches high.

A complete system of electric lighting, plumbing, heating and ventilation will be installed, as well as accommodations and comforts for the welfare of the operators.

PROPERTY OWNERS NOT TO SELECT PAVING

At a recent special meeting of the New Jersey Association of County Engineers, a resolution was presented by Frederick A. Reimer of Essex county and unanimously adopted, stating that the association strongly protests against and condemns a practice which had prevailed in many counties of the state (and is found in other states also).

As stated in the resolution: "The selection of paving materials requires expert knowledge of the probable life of these materials when subjected to the different classes of traffic. It has been the practice for many years for governing bodies to be influenced, in the selection of materials to be used for paving, by petitions from owners of property abutting upon the line of improvement. By such selection, the advice, opinion and knowledge of experienced engineers has many times been rejected, resulting in the improper selection of paving materials. The constantly increasing use of the highways in state, county and municipality demands the proper, economical and efficient development of all the highway systems in the selection of proper materials to be used in construction and maintenance." The association strongly protests against and condemns the continuation of this practice "as being against the best interests of the municipality, conducive to excessive cost and contrary to the best engineering practice."

This used to be the practice in a great many cities, but for city work it has largely been discontinued, after the scandals arising from the acts of agents of paving material manufacturers in influencing property owners to recommend their particular materials had been aired in numerous suits in the courts and aroused the public to the evils of the practice. There certainly is no more reason why it should continue in the case of county and state highways than in the case of city streets.

SLUDGE UTILIZATION IN ENGLAND.

Report of Governmental Committee on Utilization of Sludge—Recovery of Grease and Nitrogen.

Toward the end of 1918 the British government, at the request of the Institution of Municipal and County Engineers, authorized the formation of a committee to investigate the question of recovering from sewage sludge any products that may be worth salvaging. The National Salvage Council had already made preliminary inquiries at the Bradford and Huddersfield sewage works which convinced them that grease was being recovered profitably at both places. The committee formed consisted of one representative each of the following: the Local Government Board, the Board of Agriculture, the National Salvage Council, and the Institution of Municipal and County Engineers; in addition to which an engineering expert and a chemical expert on the salvaging of grease were appointed to the committee.

In its report this committee recommends a further study into the grease content of local sludges in various cities, as it is of the opinion that where a sludge after acidification contains 15 per cent of grease calculated on a perfect dry basis, it is profitable to recover the grease, provided the selling price is not less than $75* per ton and 100 tons of wet sludge are available for daily treatment. This value does not include that of the dried, degreased sludge, which is salable and, provided the nitrogen content is two per cent or more, has a market value of $2.50 to $7.50 per ton.

The committee estimates about 250 tons of wet sludge annually per thousand of population, which would give 600,000 tons of dry matter passing through the various sewage treatment plants of England, of which it estimates that not more than 12½ per cent is now being used for fertilizing purposes.

The committee is of the opinion that, although sludge after air drying or pressing does not contain sufficient nitrogen to enable it to compete with artificial fertilizers in manurial value, yet there is sufficient nitrogen in pressed sludge, as it is removed from the tanks, to give it a definite fertilizing value. Also, that considerable quantities of nitrogen are lost by delay in disposal, in some cases as much as 50 per cent of the original quantity in the sludge, and that, from the point of view of possible fertilizing value, the nitrogen so lost is the most valuable of that originally present.

It is recommended that effort be made to increase the manurial value of sludge by some method of treatment designed to fix more of the original nitrogen in the sludge. If this can be done, it would probably add a value of $2.50 per ton for each additional per cent of nitrogen retained in the sludge for use as fertilizer. To this end, experiments should be carried out on a considerable scale at selected disposal works in order to ascertain the best method of dealing with sludge so as to retain as much as possible of the original nitrogen and produce a fertilizer or fertilizer base

Although it has not gone thoroughly into the matter, it would appear from visits made by the committee to Manchester and Sheffield, where the activated sludge method is used, that the residual sludge from such processes con-

*All prices in this article are changed to American money on the basis of $5 to a pound.

tains a higher percentage of nitrogen and consequently would be of greater value as a fertilizer than sludge from plants in ordinary use.

Says the committee: "We are strongly of opinion that the time has arrived when a government committee should be appointed to follow the recent developments in the treatment of sewage by-products, with a view to collecting information for the guidance of local authorities and for the benefit of agriculturists."

WATER SUPPLY FOR THE CANTONMENTS.

Preparing Plans Under Emergency Conditions—Quantity Provided and Actual Consumption—Standard Plans for Distribution Systems and Other Features.

The emergency construction of the cantonments after the entrance of this country into the war involved a large amount of most interesting engineering work, some of which derives its interest from its unusualness and has little of permanent value unless similar emergency conditions may again arise, while other features of the work may undoubtedly prove to contain lessons which will be of permanent value. Although much was written at the time by outsiders, those who were engaged in the actual construction were too busy to even consider the preparation of descriptions of the work which they were doing. Such descriptions are now appearing from time to time. One of the latest is in the form of a paper presented to the American Society of Civil Engineers by Dabney H. Maury, Lieut-Col. of the Quartermaster Corps, advisory engineer in general charge of water supply for the Construction Division of the Army, and for many years a prominent water works engineer.

Mr. Maury was called into the service of the Construction Division of the army on May 28, 1917, when the personnel of the office comprised between forty and fifty men. By October the number had increased to 700, by March, 1918, to 1,400, and when the armistice was declared on November 11, the force in the Washington office alone numbered 2,800 and there were about 25,000 more scattered all over the country, in addition to the 200,000 laborers and other employes of the contractors.

The problem presented to the division was to construct, on unprecedentedly short notice, sixteen camps each to house about 40,000 troops. There were difficulties in obtaining on such notice as much of either material or labor as was necessary. The use of both iron and steel had to be avoided as far as possible since both of these materials were urgently needed for ships, guns and munitions.

As for water supply, there was above all the paramount necessity for absolute safety in the quality and for a quantity and pressure sufficient to meet the demands of men and horses and also for fire protection.

QUANTITY REQUIRED.

More consideration was given to the determination of the proper quantity than to any other question, and Leonard Metcalf and George W. Fuller were called in to assist in the determination of this. The result was the preparation of a general specification providing that the several systems should be capable of furnishing at least 55 gallons per capita per day, five of which was for the horses on the basis of 15 gallons for each horse or mule. While this quantity is less than is allowed in planning for most city supplies, there are many cities in this country in which the average consumption is less than fifty gallons, including all waste, leakage, and public, industrial, commercial and manufacturing uses.

Experience proves conclusively that for the cantonments this allowance was a very liberal one. Although it was impossible to prevent all leakage and waste, it is easy in military camps to keep the total consumption down to twice the maximum legitimate quantity actually required, and this quantity was estimated at not more than 20 to 25 gallons per day. When the sixteen national camps were first occupied there were only a few of them in which the consumption exceeded 55 gallons and in several it was less than 40, although at this time there was practically no check on the use or waste of water, as the Utilities Organization had not yet been perfected. However, during the severe winter of 1917-1918, the daily per capita consumption in some instances exceeded one hundred gallons, due partly to leaks in plumbing, but largely to the fact that water used for heating was not returned but was blown to waste and this alone accounted for 600,000 gallons per day per camp. By the end of the winter the Utilities Organization had begun to secure a great reduction in this and other kinds of waste, and in the early summer of 1918 the consumption was reduced to less than 55 gallons at practically all the camps, without the slightest inconvenience or shortage of water for anyone. The utilities officers made water-waste surveys and frequent inspections and repairs of plumbing, which work not only greatly reduced the waste of water, but showed conclusively that the excessive consumption was due almost entirely to waste and leaky fixtures and that underground leakage was almost invariably negligible.

The matter of water allowance was referred to in several of the discussions of Col. Maury's paper. P. H. Norcross stated that at the beginning few if any of the supervising engineers concurred in his suggestion of 55 gallons as ample, but this "early difference of opinion has been supplanted with almost unanimous approval by the consulting engineers and the military establishment." Morris Knowles said: "There is no doubt that many felt, at the time of this decision, as the speaker did himself, that there was serious doubt whether a limitation of designs and installations to a basis of 50 or 55 gallons per capita per day could be successfully applied. It is clear that the success which justified this decision was due, in a large measure, to the restrictive measures inaugurated for preventing excessive use and for distributing the peak loads by planning hours of use for various purposes." George A. Johnson, in a written discussion, said: "All the water systems had been designed on a basis of a certain fixed estimated number of troups and animals at each individual camp and a factor of safety of 2.85 times the average demand allowed in order that peak load consumptions might be anticipated satisfactorily. The rapidly fluctuating camp population was perhaps the most difficult problem for the operator to meet, and a matter which the designers of the water systems could not anticipate with precision. A notable case in this line was Camp Dix, which was laid out in all its parts for a maximum population of less than 45,000. At 3 P. M. on one day the population was 44,000. At 10 A. M. the following day it was 60,000. With the facilities provided by the designers and the exercise of considerable resourcefulness on the part of the utilities officers, however, every man was adequately supplied with water, and fire protection requirements were met."

As to the sufficiency of the supply for fire protection, Col. Maury said that many thousands of fires have started in the frame buildings at the cantonments, but in only three cases has a fire escaped beyond the building of its origin. In each case the fire department at the camp succeeded in saving a part of the barrack building in which the fire originated and a part of the mess hall to which

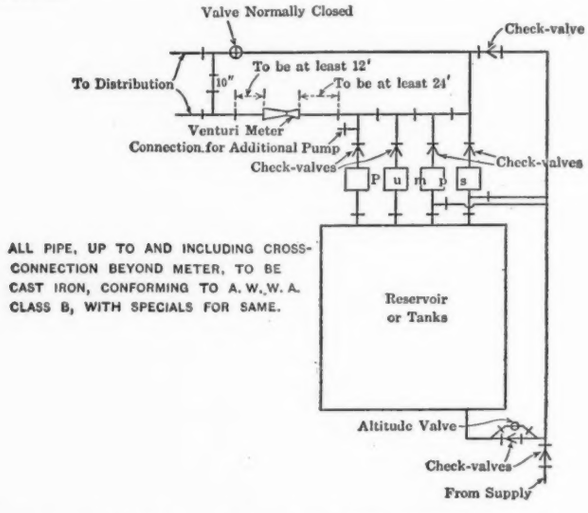
it spread. These fires were extinguished by the fire protection afforded by direct pressure from the water works systems of the cantonments. The per capita loss by fire throughout the United States in 1918 was $2.70, but the per capita loss by fire at the cantonments, camps, etc., for the year ending June 30, 1918, was only 67 cents.

STANDARD PLANS.

Days and even hours were of vital importance in getting the work started and no time could be lost in preparing plans not absolutely essential. It was manifest that no definite arrangement of units of camp structures could be adhered to for all cases, as the topography of the camp sites varied; but it was possible in almost every case to prepare unit group plans of buildings which could be strictly adhered to, the variations being in the arrangements of the several units. This permitted the preparation of standard plans for each unit, showing the location of mains and location and sizes of service pipes in each unit. The length and size of mains and their location outside the limits of the individual units were governed in each case by the topography and by the point at which the water supply was delivered to the camp.

There were three general classes of grouping of buildings, in one of which the units were strung out in a single line and the supply came in at one end, in another the supply came in at the center, and in the third the units were grouped in a horse-shoe form. The last was the ideal arrangement, since it gave an opportunity to loop the mains so as to connect the ends of the horse-shoe, which greatly reduced the friction losses and enabled smaller mains to be used.

Typical plans were prepared, for each of which there were determined economic location and size of mains, gates and fire hydrants, so that as soon as the first rough plan showing the approximate grouping of the units for any camp reached the office, it was possible to specify at once the sizes and approximate lengths of mains required and to place orders for most of the water works materials needed.



WHERE PUMPS DO NOT TAKE SUCTION UNDER HEAD, PROVIDE SUITABLE PRIMING APPLIANCES IN DUPLICATE.

WHERE EXCESSIVE PRESSURES MIGHT OTHERWISE COME ON MAINS, AS THE RESULT OF SHUTTING OFF DRAFT WHILE PUMPS ARE RUNNING AT HIGH RATES, SUITABLE RELIEF VALVES SHOULD BE PROVIDED AT PUMPING STATION.

TYPICAL ARRANGEMENT FOR PUMPING STATION

Construction details for typical layout of pumps, reservoir, tanks, meter and pipe connections, for water systems in which supply is delivered into storage and has to be pumped thence into the distribution mains, and where there is no elevated storage on distribution mains. Where there is such elevated storage, the number of pumping units may be reduced.

Mr. Maury cited one instance, that of Camp Lewis in the state of Washington, in which, on the day of his arrival on the ground, the officer of the Building Division sent to determine the location, wired as follows:

Refer Government Maneuver Map. No. 69. Follow railroad southwesterly from American Lake to Dupont Station. Draw line easterly from this station to point midway between Spray Lake and Spray Farm. This line is the center axis of camp, which is in typical horseshoe plan with open end eastward. Source of water supply, wells and springs between American Lake and Sequalitchew Lake. Site for reservoir, Hill No. 320; actual elevation, 390. Engineering Division wire sizes and lengths of water mains repaired."

This telegram arrived at the Washington office just before midnight, and within two hours the Engineering Division wired the information required, which information enabled the pipe for the distribution mains of the camp to be ordered immediately from the nearest Pacific Coast fir pipe manufacturers. A few hours thus sufficed to settle a basic question in connection with a cantonment more than 3,000 miles away. Although the location of this camp was not definitely decided until after June 28, the camp was ready for troops on September 1.

As soon as topographic maps of a camp site could be prepared showing the general arrangement of the structure units, a blue-print was furnished to the Construction Division and the locations and sizes of water mains, fire hydrants, valves and other accessories were drawn on with red pencil, and from these penciled blue-prints the necessary materials were scheduled and the schedules sent to the Materials Division for purchase. The blue-prints with the red marks were then sent back to the drafting room and traced as a water-works drawing and blue-prints from these tracings were forwarded to the camps. This plan enabled the ordering of materials immediately and they were frequently on their way to the camp before the plans had reached there.

In most cases there were at least two duplicate supply mains to the camp from both pumping station and reservoir and there were very few dead ends. Hospitals offered special difficulties in the way of fire protection because the corridors connecting the buildings eliminated fire-breaks and interfered with access to the interior courts between buildings. To offset these disadvantages as much as possible, hospital groups were given duplicate supply mains, the distribution mains were thoroughly looped and gated, the hydrant spacing was made unusually close and, wherever possible, openings were left under the corridors at strategic points.

As soon as the general features had been determined upon, general specifications and typical construction details were prepared and sent out, as well as a schedule of service pipe materials necessary for each unit in a cantonment. The standard details included methods of setting valves and hydrants, of connecting wood stave pipe to cast iron pipe or specials, of making connections between mains, of making bends in mains, of connecting service pipes to mains, etc. An illustration of this general planning is given by the accompanying illustration, which is a diagrammatic layout used in planning the piping connections at pumping stations and reservoirs. The duplication of suction and discharge mains and the location of gate valves and check valves make it impossible for the failure of any one involved to put more than two pumping units out of commission, or for the failure of any pipe or special casting to put more than one unit out of commission. Attention is called to the by-pass around the venturi meter and to the arrangements of the altitude valve on the line supplying the reservoir.

(To be continued)

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading ones published in other countries, dealing more or less directly with municipal matters. The Index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In addition to the titles, where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article. Also the name and the place of publication of the periodical in which it appeared.

ROADS AND STREETS.

Bituminous:

Estimating for Asphalt Pavement Repairs. What notes should include. By J. O. Preston, C. E., ass't engr., Rochester Bureau of Municipal Research, Inc., Rochester, N. Y. 1200 words. Municipal and County Engineering, September, Indianapolis, Ind.

Present Day Bituminous Pavement Construction. Bituminous surfaces on old pavements; central mixing plants; inspection important; handling hot material on street. By R. Keith Compton, chairman and consulting engr., Paving Commission, Baltimore, Md. 3000 words. Engineering and Contracting, Oct. 1, Chicago.

Some Practical Points to Observe in Construction of Bituminous Pavements. By R. Keith Compton, C. E., consulting engr., Paving Commission, Baltimore. 3500 words. Municipal and County Engineering, September, Indianapolis, Ind.

Resurfacing Old Macadam and Gravel Roadways with Special Reference to Adaptability of Old Roadbeds as Foundation for Hot Mix Bituminous Surfaces. By H. W. Skidmore, Chicago Paving Laboratory, Chicago, Ill. 12 ills., 5500 words. Municipal and County Engineering, September, Indianapolis, Ind.

New Stone and Gravel Roads, Insured by Surface Treatment. By F. H. Gilpin, engr., Asphalt Sales Dept., The Texas Co. 1100 words. Canadian Engineer, Sept. 4, Toronto, Ont.

Bituminous Treatment of Private Roads. Owners of large farms applied to Bureau of Public Roads for advice regarding application of bituminous material on much-traveled farm lanes. 350 words. Municipal Journal and Public Works, Sept. 27, New York.

Concrete:

Methods of Protecting Concrete Pavements Laid in Warm Weather. Canvas covering; curing by ponding, earth covering, and sprinkling. 2 illus., 1100 words. Engineering and Contracting, Sept. 3, Chicago.

New Features in Indiana's Concrete Road Specifications. Recent draft includes some of the latest ideas in highway work; materials and methods covered in detail. 2000 words. Engineering News-Record, Sept. 25, New York.

Does Rich Concrete in Roads Crack More Than Lean? Answers to questionnaire sent to engineers prominent in use of road concrete. Answers by J. C. Pearson, U. S. Bureau of Standords; Wm. D. Uhler, chief engr., Pa. State Highway Dept.; E. N. Hines, chairman, Board of Wayne county, Mich.; P. St. James Wilson, acting director, U. S. Bureau of Public Roads; A. N. Johnson, consulting highway engr., Portland Cement Ass'n; Clifford Older, chief state highway engr., Illinois; Duff A. Abrams, Lewis Institute, Chicago; A. H. Hinkle, deputy state highway commissioner, Bureau of Maintenance and Repair, Columbus, O. 3500 words. Engineering News-Record, Sept. 11, New York.

70.4 Lin. Ft. of Concrete Road Per Hour. 4 ills., 600 words. Engineering and Sontracting, Oct. 1, Chicago.

Other Kinds:

How to Secure Best Results in Construction of Improved Granite Block Pavements. Standard sizes of blocks; concrete base, sand or mortar cushion; cement grout; protection in freezing weather; methods of mixing; salvage in old granite blocks; napping second-hand blocks. 5000 words. Engineering and Contracting, Oct. 1, Chicago.

Experience with Granite Block Pavements in New Orleans, La. By J. C. Bartley, Sewer and Water Board bldg., New Orleans. 4300 words. Municipal and County Engineering, September, Indianapolis, Ind.

Surfacing Old Granite Block Pavement. Method employed in Jersey City, using asphalt, screenings and sand. By C. E. Murphy, Asphalt Sales Dept., Texas Co. 800 words. Municipal Journal and Public Works, Sept. 20, New York.

Corrugated Spacer Used for Wood-Block Pavements. Simple cardboard device spaces blocks, provides for expansion and stops bleeding; method of laying changed. By J. S. Crandell, engr., Barrett Co., N. Y. C. 2 ills., 900 words. Engineering News-Record, Sept. 4, New York.

Resurfacing Old Brick Pavement. One 23-years old in White Plains, N. Y., being covered with two inches of bitulithic; method of preparing old pavement for new surface; handling traffic during construction. 3 ills., 1400 words. Municipal Journal and Public Works, Sept. 27, New York.

Some Things Learned in Construction of Sand Clay Roads. Misuse of type; steep crown is ruinous. By W. S. Keller, state hwy. engr., Montgomery, Ala. 1000 words. Municipal and County Engineering, September, Indianapolis, Ind.

Methods of Resurfacing Old Macadam. Most general and perplexing problem met with by highway engineers in Central Kentucky. From paper at Road Builders' Week of University of Kentucky, by Wm. N. Bosler, div. engr., Dept. of Public Roads, Frankfort, Ky. 1500 words. Engineering and Contracting, Sept. 3, Chicago.

Recommended Proceedure in Construction of New Macadam Roads. By M. D. Ross, div. engr., dept. of pub. roads, Newport, Ky. 3200 words. Municipal and County Engineering, September, Indianapolis, Ind.

Financial:

Raising Funds to Pay for Roads. Those who use roads should pay for them; three methods of meeting cost. Py J. I. Blakelee, 4th ass't postmaster gen., Washington, D. C., from address at Highway Traffic Ass'n of New York. 1600 words. Municipal and County Engineering, September, Indianapolis, Ind.

Pennsylvania Townships Receive Arrears in Road Aid. 150 words. Municipal Journal and Public Works, Sept. 27, New York.

Contractors' Bonds for New York Highway work. Highway law amended by state legislature. 700 words. Municipal Journal and Public Works, Sept. 27, New York.

Good Roads. Bad road tax is more than good road tax; greater part of money left in county; engineers in road work. By Rodman Wiley, commissioner of public roads, Ky. 2 ills., 2800 words. Southern Good Roads, September, Lexington, N C. Who Should Pay for Our Highways and Why? Ideal method of charging for use of road would be one involving fixed annual charge per vehicle plus mileage charge. 800 words. Engineering and Contracting, Sept. 3, Chicago.

Cost of Surveys for Federal Aid Roads Project in Kansas. 1200 words. Engineering and Contracting, Sept. 3, Chicago.

What Has New York State Received for Its $100,000,000 Highway Expenditures? Analysis of work done during 21-year period, 1898-1919, shows economic fallacy of increasing mileage with nondurable types of construction involving high maintenance costs. By H. Eltinge Breed, engr., N. Y. C., formerly first deputy commissioner of highways, N. Y. S. 5500 words. Engineering News-Record, Sept. 4, New York.

Two Years' Record of Maintenance Costs of Primary Roads in Washington. 1 table, 1000 words. Engineering and Contracting Oct. 1, Chicago.

Effect of War on Paving Operations in Baltimore. Tabulation of accepted bid prices for 1916, 1917 and 1918. By G. E. Finck, ass't engr., paving commission, Baltimore, Md. 1 table, 1600 words. American City, September, New York.

Maintenance:

Maintenance of Macadam and Gravel Roads. From paper at Road Builders' Week of University of Kentucky, by R. C. Heath, road engr., Kentucky State Dept. of Public Roads. 1700 words. Engineering and Contracting, Sept. 3, Chicago.

Comparative Cost of Maintaining Roads with Tractor Outfit and Eight-Mule Outfit. By N. C. Hughes, Jr., highway engr., Laurens, S. C. 1 lil., 300 words. Municipal and County Engineering, September, Indianapolis, Ind.

Highway Maintenance in Wisconsin. Gang maintenance continued; surface treatment of stone and gravel macadam roads; preparation of surface; application of bitumen; treatment of bituminous macadam; concrete roads. From "Highway Maintenance," Wisconsin Highway Commission. 1300 words. Good Roads, Sept. 24, New York.

Highway Maintenance in Wisconsin. Upkeep of surfaced roads; surface treated and untreated macadam; bituminous macadam roads; cold patching methods; concrete roads; bridges; markers and signs. From "Highway Maintenance," Wisconsin Highway Commission. 1800 words. Good Roads, Sept. 10. New York.

Highway Maintenance in Wisconsin. Gang maintenance; heavy grading work; equipment and methods; resurfacing stone and gravel roads; bonding. From "Highway Maintenance," Wisconsin Highway Commission. 4 ills., 2500 words. Good Roads, Sept. 17, New York.

Highway Maintenance in Wisconsin. Upkeep of surfaced roads; methods employed for highways; of shale, pit run gravel or crushed and screened gravel. From "Highway Maintenance," Wisconsin Highway Commission. 1500 words. Good Roads, Sept. 3, New York.

Engineers:

Highway Engineers and Educating Them. Letter from Commissioner of Education to professors of universities and deans of colleges. 300 words. Municipal Journal and Public Works, Sept. 20, New York.

Proposed Schedule of Salaries for Engineers in State Highway Service. 1500 words. Engineering and Contracting, Oct. 1, Chicago.

Fellowships in Highway Engineering. Information furnished by A. Blanchard, Professor of Highway Engineering at University of Michigan. 300 words. Municipal Journal and Public Works, Sept. 27, New York.

Duties of the County Highway Engineer-Manager. Essential points for securing greatest efficiency; Mecosta county plan of co-operative road building. Abstract of paper before Michigan Engrg. Society, by E. E. Sours, county engr., Mecosta co., Mich. 2200 words. Engineering and Contracting, Sept. 3, Chicago.

Construction:

Some Lessons and Problems. Paving experiences; use of machinery; problems in mechanical loading; improved road surfaces; economies in material. Paper before Institution of Municipal and County Engineers, Hull, England. 2500 words. Canadian Engineer, Sept. 25, Toronto, Ont.

Cantonment Road Building at Camp Lewis. Methods and costs of building about 22 miles of gravel road and over 150,000 square yards of warrenite-bitulithic—with local gravel aggregate, on bituminous concrete foundation. By U. S. Marshall, senior hwy. engr., Bureau of Public Roads, U. S. Dept. of Agriculture. 6 ills., 2 maps, 2800 words, Sept. 3, 9 ills., 1800 words, Sept. 10. Good Roads, New York.

Large Portable Road Crushers. Built for use of A. E. F. in road construction work in France. By R. R. Shafter, engr., Traylor Engrg. & Mfg. Co., Allentown, Pa. 1 ill., 300 words. Canadian Engineer, Sept. 4, Toronto, Ont.

Progressive Method of Road Improvement for Rural Districts. Economic features of permanent work; drainage and under-drainage; foundation one of most important features; temporary top courses. From paper before Canadian Road Congress, by G. Henry, chief engr., Dept. of Roads, Quebec. 5000 words. Engineering and Contracting, Sept. 3, Chicago.

Pneumatic Tools for Breaking Up Pavement. By using special points a tie-tamping machine may be used for cutting

blocks and breaking up pavement. By W. P. Burn, M. E. Ingersoll-Rand Co. 7 ills., 1200 words. Electrical Railway Journal, Sept. 20, New York.

Contracts:

Little Rock-Hot Springs Highway Contract. Bulletin of Associated General Contractors contains letter from secretary givin publicity to contract let by Board of Commissioners to a firm that had not bid formally at all. 300 words. Municipal Journal and Public Works, Sept. 13, New York.

Should Contracts for Grading Upon Extensive Highway Improvements Be Awarded Separately? 2000 words. Engineering and Contracting, Oct. 1, Chicago.

Miscellaneous:

Road Drainage and Foundations. Earth loses sustaining power; side drainage for all country roads essential; soil determines foundation depth; field stone and telford. By G. Hogarth, chief engr., Ontario dept. of highways. Paper before Canadian Good Roads Ass'n. 2000 words. Canadian Engineer, Sept. 11, Toronto, Ont.

Road Drainage and Foundations. Some points of underdrainage; surface drainage; classes of foundations. By G. Hogarth, chief engr., Department of Highways. 2000 words. Engineering and Contracting, Oct. 1, Chicago.

Effect of Impact of Trucks. Tests being made by Bureau of Public Roads; apparatus used and test conditions; results obtained thus far. 7 ills., 1500 words. Municipal Journal and Public Works, Sept. 13, New York.

Impact Tests of Auto Trucks on Roads. From preliminary report by E. B. Smith, senior ass't testing engr., and J. T. Pauls, highway engr., concerning experiments being conducted by Bureau of Public Roads at Arlington Experimental Farm. 3 ills., 1500 words. Engineering and Contracting, Oct. 1, Chicago.

Motor-Truck Impact on Roads Five Times Dead Load. Experiments of Bureau of Public Roads indicate that force is dependent on speed, power and condition of truck. 3 ills., 1100 words. Engineering News-Record, Sept. 18, New York.

Highways to Lower the High Cost of Living. By J. S. Beall, pres., Armco Iron Culvert and Flume Manufacturers' Ass'n. 1200 words. Engineering and Contracting, Oct. 1, Chicago.

The Need of the Nation. National system of roads, constructed, maintained, and paid for by the Federal Government. By M. O. Eldridge, dir. of roads, American Automobile Ass'n. From address at meeting of N.C. Good Roads Ass'n. 1500 words. Southern Good Roads, September, Lexington, N.C.

Good Roads. Advantages; their cost less than that of bad roads; money spent for roads kept at home; value of farms increased by good roads; should employ engineers. Address at Williamsburgh, Ky., by R. Wiley, commissioner of public roads, Ky. 2500 words. Good Roads, Sept. 10, New York.

Highways to Lower High Cost of Living. Trucks compete with railroads; municipal markets; saves middleman's profits. By J. S. Beall, pres., Armco Iron Culvert & Flume Mfrs'. Ass'n. 1200 words. Canadian Engineer, Sept. 25, Toronto, Ont.

Good Roads. Value of diagonal highway in proper location; secondary city streets; four principles for proper construction; foundations; pavement history; what is the best pavement? maintenance; the future good road. By C. F. Puff, Jr., ass't. chief engr., Bureau of Highways. Luncheon address at Engineers' Club of Philadelphia. 3 ills., 4300 words. Journal of Engineers' Club of Philadelphia, September, Philadelphia.

Mountain Highways at Hamilton, Ont. Report submitted by N. Cauchon, of Ottawa, plans access to Stadium and park development with ruling grade of 3%. 2500 words. Canadian Engineer, Oct. 16, Toronto, Ont.

Street Classification as an Aid to Pavement Design. Practicability of such classification; relation between character and density of traffic and thickness of foundation; opinions of number of prominent municipal engineers. By J. W. Routh, director, Bureau of Municipal Research, Rochester, N.Y. 1600 words. Municipal Journal and Public Works, Sept. 6, New York.

Classification of Highways. Advantages of improved roads; necessity for classification of country's highways; description of the several classes and estimates of cost of improvement and service rendered. By H. G. Shirley, secy., Federal Highway Council, from paper before N.C. Good Roads Ass'n. 2 ills., 2300 words. Good Roads, Sept. 24, New York.

Another Meadows Highway. Will probably be constructed in meadow land between Newark and Jersey City to relieve congestion on Lincoln highway. 800 words. Municipal Journal and Public Works, Sept. 20, New York.

Instructions of Arizona State Highway Department for Guidance of Its Engineers. 3200 words. Engineering and Contracting, Sept. 3, Chicago.

Should "The Absolute Ton-Mile" Be Discarded for "The Commercial Ton-Mile?" New term advocated by "The Commercial Vehicle." 700 words. Engineering and Contracting, Sept. 3, Chicago. Highways Transport Committee Discontinued. Established by U. S. Council of National Defense as necessary adjunct to war-time activities. 200 words. Municipal Journal and Public Works, Sept. 27, New York.

The Service Man and Public Roads. Resumption of road building as oportunity for returned soldier; government encouragement of projected improvements; success of campaign to place soldiers. By Col. Arthur Woods, ass't to Secy. of War. 900 words. Good Roads, Sept. 17, New York.

A $17,000,000,000 Road Improvement Program. Highways Industries Ass'n estimates it will be necessary to expend that amount in next 10 to 15 years. 500 words. Engineering and Contracting, Sept. 3, Chicago.

American Views for French Highways. Expressed by committee of American Engineering Societies in response to conclusions submitted by French engineers for its consideration. 3000 words. Municipal Journal and Public Works, Sept. 20, New York.

Proceedings of Annual Meeting North Carolina Good Roads Association. By Miss H. M. Berry, acting secy., 5 ills., 6300 words. Southern Good Roads, September, Lexington, N. C.

SEWERAGE AND SANITATION.

Sewage Treatment:

Operating Experiences with Activated Sludge Process for Factory Wastes. Activation of outside material; combustion of organic matter; final sedimentation; quality of effluent. By G. W. Fuller, cons. engr., 170 Broadway, N. Y. C. 2800 words. Municipal and County Engineering, September, Indianapolis, Ind.

A Sewage Treatment Experiment. Being conducted at Mt. Vernon sewage treatment plant on modified activated sludge process and a new drum screen. 1300 words. Municipal Journal and Public Works, Sept. 27, New York.

Electrolytic Sewage Treatment. Investigation of Easton plant by committee of Franklin Institute; chemical and bacterial effect of treatment; cost of treatment. 1600 words. Municipal Journal and Public Works, Sept. 6, New York.

Tests of Lime-Electrolytic-Agitation Sewage-Treatment Process at Easton, Pa. Landreth "direct-oxidation" system studied by engineering division of Pennsylvania State Dept. of Health and for committee of the Franklin Institute. 1 ill., 4500 words. Engineering News-Record, Sept. 18, New York.

Electrolytic Sewage Treatment Not Yet an Established Process. Editorial reference to direct-oxidation process in demonstration plant at Easton, Pa. 2000 words. Engineering News-Record, Sept. 18, New York.

Sewage-Disposal Difficulties at Madison, Wis. Sludge handling improved by hoppers and new pipe connections for flat-bottom tanks; history of plant. 1 ill., 2400 words. Engineering News-Record, Sept. 11, New York.

Investigation of Odors from Lake at Madison, Wis. Sewage plant gets popular blame, but study will include algae, trade wastes and surface and street drainage. 1000 words. Engineering News-Record, Sept. 4, New York.

Sewage Treatment at English Military Camps. Some interesting information presented by G. P. Kenshaw, consulting engr. of London, on his experiences in sewage disposal in British camps. 1000 words. Enginering and Contracting, Sept. 10, Chicago.

Utilization of Sewage Sludge in Birmingham, England. Shallow tanks and thoro digestion furnish sludge without odor and with great possibilities as an organic fertilizer. 4 ills., 1500 words. American City, September, New York.

Progress in Sewage Purification at City and County of Canterbury Since 1868. Paper before Ass'n of Managers of Sewage Disposal Works at Canterbury, England, by C. Terry, sewage disposal works mgr. 1000 words. Municipal Engineering and Snitay Record, Aug. 21, London, Eng.

Sewerage Works of Stratford, Conn. Invert of sewer at plant is three feet below high tide and three feet above low tide; effluent held in tidal chamber during flood tide; Imhoff tanks and chlorination. By Clyde Potts, M.Am.C.E. 2 ills., 1600 words. Municipal Journal and Public Works, Sept. 13, New York.

The Sewage Disposal System. Description of Albany's intercepting sewer and sewage disposal plant, begun in 1915 and now completed and in operation. By F. R. Lanagan, city engr. 1400 words. Fire and Water Engineering, Sept. 24, New York.

Sewage Disposal of Chicago. New projects and methods will be needed before completion of present projects, because of city's growth and conditions; lack of appreciation by general public of seriousness of situation. By C. D. Hill, engr., construction bureau, Chicago. 3000 words. Engineering World, Sept. 1, Chicago.

Construction:

Trench Machinery. With special attention to machinery applicable to sewer and such-like trenches. Paper before Conference of Institution of Municipal and County Engineers, by A. E. Collins, city engr., Norwich, England. Discussion. 23 ills., 6500 words. Journal of Institution of Municipal and County Engineers, Aug. 16, London, England.

Tunnelling Machines in Sewer Excavation. 2 ills., 600 words. Engineering and Contracting, Oct. 16, Chicago.

Cost:

Cost of Constructing Sewers and Water Mains at Montreal South, Que. 700 words. Engineering and Contracting, Oct. 8, Chicago.

Why Cities Should Issue Bonds for Sewers and Other Public Works Rather Than "Pay as They Go." Editorial. 800 words. Engineering and Contracting, Sept. 10, Chicago.

Traps:

Advocacy for Abandonment of the Intercepting Trap. Editorial. 500 words. Municipal Engineering and Sanitary Record, Sept. 11, London, England.

WATER SUPPLY

Dams and Reservoirs:

Plans for Earth Dam Construction Involve Large Use of Machinery. Designs for structure 100 feet high at Providence, R. I., completed and specifications well advanced. By F. E. Winsor, chief engr., Water Supply Board, Providence, R. I. 1000 words. Engineering News-Record, Sept. 25, New York.

The Gilboa Dam. New structure will double Catskill water supply for New York City. By H. Gardner. 5 ills., 3300 words. Engineering World, Sept. 15, Chicago.

Fundamentals in Design of Multiple-Arch Dam. Applicability and restrictions of this type of structure and principles controlling its design; illustrated by New Lake Eleanor dam for San Francisco water supply. By R. P. McIntosh, hydraulic engr., San Francisco. 5 ills., 4500 words. Engineering News-Record, Sept. 4, New York.

New Concrete Dam of the Oklahoma City Water-Supply. Work begun in February, 1917, now practically complete. 1 ill., 300 words. American City, September, New York.

Groined Arches or Flat Roof for Concrete Reservoirs. Several engineers and builders give opinions as to relative economy and safety, based on experience with both types through a number of years. 3000 words. Engineering News-Record, Sept. 18, New York.

Construction Features of Grand River Roller Crest Dam. Most notable feature is roller crest by which entire upper 10 feet of dam can be lifted above high water. 1 ill., 2000 words. Engineering and Contracting, Sept. 10, Chicago. 1 ill., 3000 words. Engineering World, Sept. 1, Chicago.

Dam and Tunnel Construction by the Marin Water District. Gravity type dam; siphon spillway of dam; labor costs of Pine mountain tunnel. Described by H. M. Bowers, ass't engr., in recent issues of Journal of Electricity. 2 ills., 1000 words. Engineering and Contracting, Sept. 10, Chicago.

The Silting Up of Reservoirs. Silt deposits from southwestern streams; quantity of silt carried by stream; remedial measures for silting. 2800 words. Engineering and Contracting, Sept. 10, Chicago.

10,000,000 Gallon Reservoir at Dayton, O. Described by L. Metcalf and W. T. Barnes, of Boston, Mass., in paper before New England Water Works Ass'n. 600

words. Canadian Engineer, Oct. 9, Toronto, Ont.

Methods of Constructing Hydraulic Fill Dams of Miami Conservancy District. 1 ill., 5,500 words. Engineering and Contracting, Oct. 15, Chicago.

Pumping

Pumping Plants for Small Water Works. Comparative costs for different types. From Journal of New England Water Works Association, by H. A. Symonds. 2000 words. Engineering and Contracting, Oct. 8, Chicago.

Building Up a Worn Pump with the Oxy-Acetylene Process. By C. C. Phelps, engrg. dept., Oxweld Acetylene Co., N. Y. C. 1 ill., 800 words. Municipal and County Engineering, September, Indianapolis, Ind.

Pumps for Small Water Works. Table of comparative fuel and first costs of various types of pumping plants. 2300 words. Canadian Engineer, Sept. 11, Toronto, Ont.

Reconstruction of Water Works at Cobourg, Ont. Four electrically-driven pumping units, each 750 G. P. M. capacity, on domestic service; gasoline-engine-driven unit replaces steam as standby; three mechanical filter tanks operating under normal conditions at double rated capacity. By A. E. Davison, municipal engr., Hydro-Electric Commission of Ontario. 3 ills., 1300 words. Canadian Engineer, Sept. 11, Toronto, Ont.

Air Lift for Deep Wells. Development and improvement of a simple method of pumping. By J. Oliphant. 4 ills., 2000 words. American City, September, New York.

Test Shows Over 82 Per Cent Efficiency of Motor-Driven Centrifugal Pump. 3 ills., 800 words. Engineering and Contracting, Sept. 10, Chicago.

Pumping Water for Irrigation Makes Important Power Load. Hundreds of orchards in Washington watered by pumping plants supplied by hydro-electric power; types of pumps used. By W. A. Scott. 900 words. Electrical Review, Sept. 27, Chicago.

Test Shows 82.1% Over-All Efficiency of Motor-Driven Centrifugal Pump. By R. N. Austin, mgr., Turbine Equipment Co., Ltd., Toronto. 4 ills., 1000 words. Canadian Engineer, Oct. 2, Toronto, Ontario.

Meters and Rates:

Metering Renders Additional Water Supply Unnecessary. Master meter and consumers' meters installed at Middletown, Conn., are followed by a material reduction in consumption. 1000 words. Engineering News-Record, Sept. 25, New York.

Meter Maintenance. Cost of repairing and maintaining meters in American cities; intervals at which meters are tested and methods of testing; repairs which are made by water works employes. 2¼ pages tables, 100 words. Municipal Journal and Public Works, Sept. 13, New York.

Venturi Meters at Baltimore. Experience both extensive and interesting; some notable installations described and illustrated; reversible flow Venturi meter. 5 ills., 600 words. Fire and Water Engineering, Sept. 24, New York.

Meters. Data supplementary to those published in June 7th issue; number, reading and billing in different cities. 3 pages tables. Municipal Journal and Public Works, Sept. 6, New York.

Methods Used and Results Obtained in Metering the Water Supply of Terre Haute, Ind. By Dow R. Gwinn, pres. and mgr., Terre Haute Water Works Co. 5 ills., 4000 words. Municipal and County Engineering, September, Indianapolis, Ind.

Computation of the Coefficient of Discharge of Venturi Meters. Tests at University of Pennsylvania indicate that coefficients may be computed within 0.5% of experimental values. By W. S. Pardoe, ass't prof. of civ. engrg., University of Pennsylvania. 6 charts, 2 tables, 1000 words. Engineering News-Record, Sept. 25, New York.

Flat Rates vs. Meter Rates. Superintendent of water works of Tuscaloosa, Ala., finds flat rate system unjust to consumer; comparison of statistics. 500 words. Engineering and Contracting, Sept. 10, Chicago.

Waste Water Control. Successful results in Trenton and Buffalo; selective metering; table showing per capita in some larger cities in Great Britain. By E. D. Case, gen. mgr., the Pitometer Co., N. Y. C. Paper before Southwestern Water Works Ass'n. 2500 words. Engineering World, Sept. 1, Chicago.

Water Waste Control by House Inspections with District Metering. 900 words. Engineering and Contracting, Sept. 10, Chicago.

Philadelphia's Fight Against Water Waste. First of a series of articles telling story of successful campaign on broad line; water waste division organized; house-to-house inspection and pitometer night surveys; mapping the gridiron. By Wm. M. Crowe, ass't engr., Philadelphia bureau of water. 5 ills., 1700 words. Fire and Water Engineering, Sept. 24, New York.

Financial:

Some Economies That May Be Effected in Operation and Maintenance of Water Works System. By H. V. Knouse, ass't supt. and purchg. agt., Metropolitan Water Dist., Omaha, Neb. 7 ills., 3000 words. Municipal and County Engineering, September, Indianapolis, Ind.

Management of Municipal Water Works. Introduction of a budget system, metering and water waste surveys have increased economy of operation of the Sault Ste. Marie water works. By W. M. Rich, city manager, Sault Ste. Marie, Mich. 2500 words. American City, September, New York.

Methods of Effecting Economies in Water Works Operation. Locating leaks in pumping station operation; special rigs and methods for handling lines. By H. V. Knouse, ass't supt. and purchg. agent, Metropolitan Water Dist., Omaha, Neb. 2000 words. Engineering and Contracting, Oct. 8, Chicago.

Cost of Laying Water Pipe. Itemized costs from Rome, N. Y. and Canton, O. 200 words. Municipal Journal and Public Works, Sept. 13, New York.

Distribution System:

Constructing a 98-Kilometer Water Conduit in Chile. Wrought-iron pipe for Toconce line carted and dollied and supplies moved by carts and pack mules through mountainous desert; much pipe laid by machine; camp and conduit costs. By G. H. Bayles, ass't resident engr. in charge of constr.; now at Morgantown, W. Va. 10 ills., 5000 words. Engineering News-Record, Sept. 25, New York.

Diagram for Computing Band Spacing for Wood-Stave Pipe, for pipe 1 to 20 in diameter, under heads of from 10 to 200 feet and for band diameters of 3/8 to 1¼ inches. By W. T. Batcheller, engr., Municipal Light and Power System, Seattle, Wash. 1 ill., 500 words. Engineering News-Record, Sept. 4, New York.

Unusual Damage Caused by Break. Split in 48-inch Catskill main in Brooklyn does great damage to adjacent property; unusual amount of earth moved by escaping water; cause and effect of break; method of repair adopted. By Wm. W. Brush, deputy chief engr., Dept. of Water Supply, Gas and Electricity. 5 ills., 2200 words. Fire and Water Engineering, Sept. 24, New York.

Backfilling the Red River Tunnel. Concrete poured around 60-inch cast-iron pipe in 10x10-foot rock bore by dropping it 70 feet from trestle across river. By J. Armstrong, div. engr., Greater Winnipeg Water Dist., Winnipeg, Man. 2 ills., 1300 words. Canadian Enigneer, Oct. 9, Toronto, Ont.

Purification:

Operation of Drifting Sand Filters at Toronto. Average reduction of 85.4% in total bacterita and of 94.8% in B. Coli during 1918; chlorination killed practically all remaining bacteria; more coagulant needed in summer than in winter; water undergoes two distinct changes during year. By N. J. Howard, bacteriologist-in-charge, filtration plant laboratory, Toronto. 3 ills., 4 tables, 5000 words. Canadian Engineer, Oct. 2, Toronto, Ont.

Notes on Filtration Plant Operations at St. Louis. Coating of sand grains; holes in filter sand made by fish; screening filter units; locating loose strainer plates. Abstract of report by A. G. Nolte, supt. of plant. 1900 words. Engineering and Contracting, Oct. 8, Chicago.

Legal Responsibility for a Pure Water Supply. By J. Wilson, consulting engr., Duluth, Minn., who was closely associated with litigation following typhoid epidemic in Mankato, Minn., in 1908. 2300 words. American City, September, New York.

Protecting New York's Water Supply. All water treated with liquid chlorine; practically all surface water; chlorine recognized as cheapest form of municipal health insurance; method of application. By Wm. J. Orchard, sanitary engr., Wallace & Tiernan Co., N. Y. C. 1 ill., 1200 words. Fire and Water Engineering, Sept. 24, New York.

Operation of Slow Sand Filters at Toronto. 10,000 samples tested during 1918 show 99.7% average reduction in B. Coli, 99.1% in total bacteria, and 99% in excremental bacteria; pollution of raw water increased 61.9% in five years judged by B. coli tests. By N. J. Howard, bacteriologist-in-charge, Filtration Plant laboratory, Toronto. 8 tables, 2300 words. Canadian Engineer, Sept. 18, Toronto, Ont.

New Water Filtration Plant of Whiting, Ind. Testing station operated for obtaining solution of certain problems; results well justified expense. By R. S. Rankin, engr. with Pearse & Greeley, Chicago. 4 ills., 2000 words. Engineering & Contracting, Sept. 10, Chicago.

Result of First Year's Operation of Point St. Charles Filtration Works, Montreal. 900 words. Engineering and Contracting, Sept. 10, Chicago.

Chlorination and Health of Communities. Interesting chart showing relation of chlorination of water supplies to lessening of typhoid caused by pollution. 1 chart, 300 words. Fire and Water Engineering, Sept. 3, New York.

Drifting Sand Filtration System of Toronto. Coagulation plant; pumping station; filters; loss of head; sand scour; turbidity. 4 ills., 27000 words. Engineering, Oct. 8, Chicago.

Run-off:

Watershed Run-Off in Ontario. Results of stream flow and rainfall measurements at 48 stations during 1918; inches on watershed and percentage of rainfall. 900 words. Municipal Journal and Public Works, Sept. 27, New York.

Stream Flow and Percolation Water. Percolation and hydraulic laws; subsoil storage reservoirs; hydraulic similarity; basic curve and percolation discharge. By S. Hall, ass't water engr., Belfast. Paper before Institution of Water Engrs. of Great Britain. 4 charts, 4300 words. 2300 words, Sept. 18. Canadian Engineer, Toronto, Ont.

Method of Constructing a Diagram to Show Probable Droughts. Illustrated by study of rainfall during 10-day periods, or decades of days, for 32 years, at Kherson, European Russia. By V. V. Tchikoff, consulting civ. engr., Berkeley, Cal. 1 ill., 1000 words. Engineering News-Record, Sept. 18, New York.

Fire Protection

Water Departments and Private Fire Lines. Proper regulations governing private fire protection lines; suggestions for compensation; contamination of water supply; references to court decisions. Excerpts from paper before Indiana Sanitary and Water Supply Ass'n., by D. R. Gwinn, Terre Haute, Ind. 2700 words. Canadian Engineer, Sept. 25, Toronto, Ont.

Planning of Water Works for Fire Protection. Analysis of relationship of various items entering into this important service. By H. M. Blomquist, principal ass't engr., Bureau of Water, St. Paul, Minn. 3500 words. American City, September, New York.

San Francisco's Auxiliary System. High pressure water supply for fire protection; one high pressure hydrant gives more water than three fire engines; fire cisterns as reserve in case hydrants are not available. By F. M. Hyde, ass't mechanical engr. 7 ills., 2000 words. Fire and Water Engineering, Sept. 3, New York.

Miscellaneous:

Pressures in Penstocks Caused By the Gradual Closing of Turbine Gates. By E. Halmos, designing engr., Barclay Parsons & Klapp, N.Y. 2500 words. Canadian Engineer, Sept. 25, Toronto, Ont.

Pressure Rise Caused by Gradual Gate Closure. Application of Prof. Joukovsky's theory of maximum water-hammer; solution of problem by arithmetic integration; derivation of formulas; paper presented to American Society of Civil Engrs., by N. R. Gibson, hydraulic engr., Hydraulic Power Co., Niagara Falls. 2 charts, 3 tables, 5000 words., Sept. 4, 7 charts, 3000 words Sept. 11. Canadian Engineer, Toronto, Ont.

Tests of Paints for Interior Surface of Iron Standpipes. Summarized in paper prepared by C. W. Sherman, of Metcalf & Eddy, Boston, and presented at New England Water Works Association. 900 words. Engineering and Contracting, Oct. 8, Chicago.

Protecting Iron and Steel Standpipes from Corrosion. Data summarized in paper presented by C. W. Sherman, of Metcalf & Eddy, Boston, and presented at New England Water Works Association. 1100 words. Canadian Engineer, Oct. 9, Toronto, Ont.

The Ipswich River Water Supply for city of Lynn, Mass. By H. K. Barrows, cons. engr., 6 Beacon st., Boston. 4 ills., 1600 words. Municipal and County Engineering, September, Indianapolis, Ind.

Three Million for Columbus' Water Works. 100 words. Municipal Journal and Public Works, Sept. 13, New York.

Suggested Improvements for Water

Works of Fort Wayne, Ind. Abstract of report of Natl. Board of Fire Underwriters' Committee on Fire Prevention and Engineering Standards. 1200 words. Engineering and Contracting, Oct. 8, Chicago.

Reconstructing Madison's Water Works. New pumping station and larger plant built on site of old without interrupting service; new reservoir and air lift. 1500 words. Municipal Journal and Public Works, Sept. 13, New York.

New Well Supply at Minot, N. Dak. Investigation of sources and possible means of securing larger and better supply begun under direction of F. Bass, consulting engr. Abstract of paper by A. Hunt in Bulletin of Affiliated Engrg. Societies of Minnesota. 1100 words. Engineering and Contracting, Sept. 10, Chicago.

Relation Between Water Supply and Goiter. Traced by Mayo Tolman, chief engineer, W. Va. State Department of Health, in American Journal of Public Health. 600 words. Engineering News-Record, Sept. 11, New York.

Root, 24 feet long, taken from 10-inch Water Main at Lakeville, N. Y. 1 ill., 400 words. Engineering and Contracting, Sept. 10, Chicago.

Baton Rouge Water Supply. Unusual ground water conditions in Louisiana city; wells drilled by rotary process; no rock encountered; apparent connection between river and sand strata; 2000 feet greatest depth. By L. R. Howson, of Alvord & Burdick, Chicago, Ill. 3 ills., 2000 words. Fire and Water Engineering, Sept. 17, New York.

Water Works and Electric Plant of Kansas City, Kans. Modern equipment properly operated and supervised insures economy. By H. C. Chapman, water and light commissioner, Kansas City. 3 ills., 1300 words. American City, September, New York.

Water Works of Alabany. 90 per cent of supply from Hudson river; purification by sedimentation, rapid and slow filtration and chlorine treatment; the distribution system; history of water works. By W. Greenalch, commissioner of public works, Albany. 2 ills., 2000 words. Fire and Water Engineering, Sept. 24, New York.

Some New York State Water Works. Water supply of Hudson; Saratoga's water and sewage disposal system; Poughkeepsie's department self-sustaining; four reservoirs in Glens Falls water works. 5 ils., 3300 words. Fire and Water Engineering, Sept. 24, New York.

Albany Water Works a Hundred Years and More Ago. Private company formed in 1800 based first rates on number of fireplaces, but soon changed; pipe priced at $100 a ton. 1200 words. Engineering News-Record, Sept. 25, New York.

Some Results of Supervision of Public Water Supplies by N. Y. State Department of Health. By T. Horton, chf. engr., Div. of Sanitary Engrg., N. Y. State Dept. of Health, from paper before the New England Water Works Association. 1 ill., 1300 words. Engineering and Contracting, Oct. 8, Chicago.

The Managerial Law of Inspection and Constructive Criticism, with Special Reference to Water Works. By H. P. Gillette, editor, 1000 words. Engineering and Contracting, Oct. 8, Chicago.

Lack of Foresight in Municipal Water Supplies. Planning for future and even provision for current needs are safeguards against emergencies often neglected. By Morris Knowles, consulting engr., Pittsburgh, Pa. 600 words. Engineering News-Record, Sept. 25, New York.

Points to Be Considered in Reconstruction of Small Water Power Plants. Effect of raising pond on backwater situation; selection of turbine. 4700 words. Engineering and Contracting, Sept. 10, Chicago.

Schoharie Development of Catskill Water Supply System of New York City. The Gilboa dam; the Shandaken tunnel. Abstract of paper before New England Water Works Ass'n., by J. Waldo Smith, chief engr., Board of Water Supply, N. Y. C. 6 ills., 2800 words. Engineering and Contracting, Oct. 8, Chicago.

The New England Water Works Association. 38th annual convention to be held in Albany; plans maturing for very successful meeting; program as arranged to date. 102 ills., 2400 words. Fire and Water Engineering, Sept. 24, New York.

LIGHTING AND POWER.

Electricity:

California Municipal Electric Plants. Financial results last year of municipal operation of such plants; municipalities taking over private plants. 1200 words. Municipal Journal and Public Works, Sept. 20, New York.

New and Extraordinary Records in Electrical Exports. Figures for June over double those of a year ago; fiscal year nearly 48% better than last. 600 words. Electrical Review, Sept. 6, Chicago.

Pennsylvania Electric Association Holds Interesting Convention. Quality of papers and exhibits notable features of successful meeting. 2 ills, 1800 words. Electrical Review, Sept. 13, Chicago.

Power-Factor Correction by Use of the Static Condenser. Characteristics of static condenser installations; causes of low power-factor; operating costs and purchase price. Paper before Pennsylvania Electric Ass'n, by O. C. Roff, General Electric Co. 8 ills., 2300 words. Electrical Review, Sept. 13, Chicago.

Delivery of High-Tension Service to Large Consumers. General considerations involved; relation of cost of equipment; metering. By R. Collier, operating and sales manager, Georgia Railway & Power Co. 2 ills., 4500 words. Electrical Review, Sept. 6, Chicago.

Water Power

Undeveloped Water Powers of New Brunswick. List of possible sites totals 23,000 H. P. (24-hour power), not including the grand falls of St. John and Nepisguit rivers; paper read at Engineering Institute's professional meeting. By C. O. Foss, chairman, N. B. Water Powers Commission. 1700 words. Canadian Engineer, Sept. 18, Toronto, Ont.

Reconstruction of Small Water Power Plants. Application of known data; factors influencing head: effect of raising pond; pulling down pond; selection of turbine. From paper before Michigan Engfg. Society, by R. K. Holland, Ann Arbor, Mich. 3,500 words. Canadian Engineer, Oct. 2, Toronto, Ont.

Hydroelectric Energy in France. Fuel supply being inadequate, France must develop her sources of "white coal" in order to meet industrial needs; America can cooperate in hydroelectric development. By C. W. Veditz, former American commercial attache at Paris and Madrid. 2500 words. Electrical Review, Sept. 13, Chicago.

Gas

Financial Status of British Gas Undertakings. Price for gas, profits, financing and restriction discussed in capable and interesting way by one familiar with actual conditions. By N. H. Humphrys, Salisbury, Eng. 2000 words. Gas Age, Sept. 15, New York.

Temperatures in By-Product Coke Practice. From advance abstract of report to be published as Technological Paper no. 137 by U.S. Bureau of Standards. By R. S. McBridge and W. A. Selwig. 5 ills., 2300 words. GaGs Age, Sept. 15, New York.

Miscellaneous

Proposed Tidal Power Development at Hopewell. Dams and power house at confluence of Petitcodian and Memramcock rivers; initial installation of 90,000 H. P. would cost approximately $122 per H. P. Paper at Engineering Institute's 5th professional meeting, by W. R. Turnbull, cons. engr., Rothesay, N. B. 9 ills., 7000 words. Canadian Engineer, Oct. 9, Toronto, Ont.

How to Increase Boiler-Room Efficiency. Test and Operating results; percentage of carbon dioxide as indication of boiler efficiency; efficiency loss due to impure feed water. Abstract of paper before American Boiler Mfrs.' Ass'n, by D. S. Jacobus, advisory engr., Babcock & Wilcox Co. 2000 words. Engineering and Contracting, Sept. 10, Chicago.

Central-Station Rates in Theory and Practice. 9th article—Comparison of cost-of-service and value-of-service principles in rate making; price splitting; analysis of relation between selling price and earnings. 1 ills., 3700 words. Sept. 6. 10th article—Continuation of mathematical analysis of price splitting when value-of-service principles is followed; conditions under which price reductions are desirable as regards earnings. 2 ills., 4500 words., Sept. 13. 12th article—Discussion of results of mathematical study of price splitting; comparison of different modifications of value-of-service system. Sept. 27. 1 ill., 5500 words. By H. E. Eisenmenger. Electrical Review, Chicago.

Pressures in Penstocks Caused by the Gradual Closure of Turbine Gates. With reference to discussion of N. R. Gibson's paper before American Society of Civ. Engrs. (See Sept. 4 and 11 issues of Canadian Engineer) By M. M. Warren, Stone & Webster Engrg. Corporation, Boston. Mass. 800 words. Canadian Engineer, Oct. 2, Toronto, Ont. Discussion by O. V. Kruse, hydraulic engr., Larner-Johnson Valve & Engrg. Co., Philadelphia. 2 ills., 2700 words. Canadian Engineer, Oct. 8, Toronto, Ont.

Pumping Water for Irrigation Makes Important Power Load. Hundreds of orchards in Washington watered by pumping plants supplied by hydro-electric power; types of pumps used. By A. Scott. 900 words. Electrical Review, Sept. 27, Chicago.

European Power Plant Practice. Study of European plants indicates new lines for development in this country and also shows where American engineers and manufacturers might extend operations; virtually no outdoor substations in Western Europe. By S. Q. Hayes, engrg. dept., Westinghouse Electric & Mfg. Co. 9 ills., 3500 words. Electrical World, Sept. 6, New York.

The Energy Component in Industry. Analysis of extent to which power enters into manufacturing in United States; electrification of industry is paralleled by lower unit energy costs and increased absorption of power. 9 ills., 2100 words. Electrical World, Sept. 20, New York.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning and Refuse Collection in Newark. Appliances, methods and organization in a large manufacturing and commercial city; cleaning by motor flushers, machine brooms and hand; private and municipal collection; meadow dumps; pig farm. 3 ills, 1700 words. Sept. 20. Details of collection service; records of men and teams employed, amount and nature of work performed, and personal efficiency. 1 ills., 2700 words, Sept. 27, Municipal Journal and Public Works, New York.

Newark, N.J. to Dispose of Garbage by Feeding to Swine. Contract for five years awarded to the National Utilization Co. 600 words. Engineering and Contracting, Sept. 10, Chicago.

Newark Garbage-Feeding Contract. City will deliver garbage to piggery on shore of Passaic river, where it will be weighed. By J. W. Costello, engrg. supervisor, Bureau of Street Cleaning and Refuse Collection, Newark, N.J. 600 words. Engineering News-Record, Sept. 4, New York.

Profit in Garbage-Fed Hogs. Experience of Lansing, Mich., shows that proper care increases revenues. By E. C. W. Schubel, D. V. S., supt., garbage dept. and hog farm, Lansing. 2 ills., 2200 words. American City, September, New York.

Electric Trucks for Refuse Collection. Cleansing superintendent of Sheffield, England, has prepared improved scheme for collecting and disposing of house refuhe; experience with electric vehicles during last four years eminently satisfactory. 400 words. Municipal Journal and Public Works, Sept. 6, New York.

Trend in Municipal Refuse Collection and Disposal. Estimating Costs. By R. Hering, D. Sc., cons. engr., 170 Broadway, N.Y.C. 3000 words. Municipal and County Engineering, September, Indianapolis, Ind.

Disposal of Commercial Wastes. Merchant's Association of New York City has employed Prof. O. H. Landreth to study problem. 100 words. Municipal Journal and Public Works, Sept. 20, New York.

The Glasgow Cleansing Report. Petrol-driven sweeping machines compare favorably with horse-driven; electric vehicles for refuse collection more satisfactory than petrol; comparative costs given. 400 words. Municipal Engineering and Sanitary Record, Aug. 21, London, Eng.

To Prevent Street Littering. Measures taken by the Bureau of Street Cleaning in New York for keeping streets in lower east side even passably clean. 800 words. Municipal Journal and Public Works, Sept. 20, New York.

TRAFFIC AND TRANSPORTATION.

Traffic Regulation

Highways Transport Committee's General Traffic Regulations. Proposed regulations and suggestions for their utilization being distributed as part of committee's safety campaign. Illustration of folder. 1500 words. Good Roads, Sept. 3, New York.

Standard Highway Traffic Regulations. Proposed by Highways Transport Committee for adoption by cities and other political units throughout country. 2300 words. Municipal Journal and Public Works, Sept. 6, New York.

(*Continued on page 234*)

NEWS OF THE SOCIETIES

Nov. 12-14.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Springfield, Ill.

Feb. 9-13, 1920.—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention, Louisville, Ky. Secretary, E. L. Powers, 150 Nassau street, New York.

American Society for Municipal Improvements.

The twenty-fifth annual convention will be held at New Orleans on November 11 to 14. This will be the first convention since 1916, the society having decided to omit them during the two following years because of the war. The program will be as follows:

TUESDAY, NOVEMBER 11, 1919.

Morning.

9—Registration. Committee Meetings.

11—Executive Committee. Committees on Standard Specifications:

10—Bituminous Macadam and Concrete, and Asphalt Block Pavements: M. R. Sherrerd, chairman.

11—Sheet Asphalt Pavements: F. P. Smith, chairman.

12—Broken Stone and Gravel Roads: A. H. Blanchard, chairman.

10—Brick Pavements: E. H. Christ, chairman.

11—Cement-Concrete Pavements: W. A. Hansell, Jr., chairman.

12—Sidewalks and Curbs: S. Sammelman, chairman.

10—Stone Block Pavements: H. H. Smith, chairman.

11—Wood Block Pavements: E. R. Dutton, chairman.

12—Sewers: A. Potter, chairman. Foundations for Pavements: F. P. Smith, chairman, if called for by chairman.

Afternoon Session, 2 O'clock.

Addresses of welcome: Mayor Martin Behrman, New Orleans; W. B. Thompson, president, World's Cotton Conference, New Orleans.

Response: George H. Norton, first vice-president.

President's Address: By Elbridge R. Conant, highway engineer, Brunswick, Ga.

Report of Executive Committee.

Report of Secretary: Charles Carroll Brown, Valparaiso, Ind.

Report of Treasurer: F. J. Cellarius, Dayton, O.

Report of Finance Committee: E. S. Rankin, chairman, Newark, N. J.

Selection of Committee on Nominations, Place of Meeting and Resolutions.

Report of Committee on Public Markets: A. Prescott Folwell, chairman, New York.

"The Port of New Orleans," by J. Devereaux O'Reilly, consulting engineer, chief engineer, Board of Port Commissioners, New Orleans, La.

Report of Committee on Municipal Legislation: Norman S. Sprague, chairman, Pittsburg, Pa.

Report of Committee on Fire Prevention, Alcide Chausse, chairman, Montreal, Quebec.

Evening Session, 8 O'clock.

Ladies: Theatre party to attend performance of "The Better 'Ole," at the Tulane Theatre. (Meeting place, Ladies' Parlor, Grunewald Hotel.)

Gentlemen: Smoker, tendered by the Local Committee (at Grunewald Hotel).

WEDNESDAY, NOVEMBER 12, 1919.

Morning Session, 9 O'clock.

Report of Committee on Water Works and Water Supply: George G. Earl, chairman, New Orleans.

"The Sewerage, Water and Drainage Systems of New Orleans," illustrated by stereopticon, by George G. Earl, general superintendent, Sewerage and Water Board, New Orleans, La.

Report of Committee on Sewerage and Sanitation: Frederick A. Dallyn, chairman, Toronto, Ont.

"Economic Values in Sewage and Sewage Sludge," by Raymond Wells, consulting chemist, Homer, N. Y.

"The Modern Grit Chamber," by George B. Gascoigne, sanitary engineer, Sub-division of Sewage Disposal, Cleveland, O.

"Brooklyn, N. Y., Sewage Treatment Station; a Brief Review of Five Years' Work," by George T. Hammond, Surgeon (Reserve) U. S. Public Health Service, Brooklyn, N. Y.

"Garbage Disposal and Economic Recovery of Valuable Constituents of Municipal Waste," by Samuel A. Greeley, Pearse and Greeley, consulting engineers, Chicago, Ill. Illustrated by stereopticon.

Discussion by Alfred F. Raymond, Member of Special Committee to Study Garbage Collection and Disposal, New Orleans; by L. L. Tribus, Tribus and Massa, consulting engineers, New York; by Raymond Wells, consulting chemist, Homer, N. Y.

Report of Committee on Street Cleaning, Refuse Disposal and Snow Removal: George H. Norton, chairman, Buffalo, N. Y.

Afternoon, 12 O'clock.

Trip around New Orleans Harbor on Steamer Sidney, leaving hotel at 12 noon, in which will be seen, all of the harbor, publicly-owned warehouses, grain elevators, cotton warehouses and all other improvements of the Second Port of the United States, as well as the historic Chalmette Battle Grounds, where the Battle of New Orleans was fought.

Luncheon will be served on the boat, and good music provided for dancing.

Evening Session, 8 O'clock.

Election of officers and selection of place of meeting.

"Methods of Sewage Disposal Used by the Emergency Fleet Corporation," by Clark P. Collins, senior assistant engineer, Engineering Branch of Housing Department, U. S. Shipping Board, Emergency Fleet Corporation, Philadelphia, Pa. Illustrated by stereopticon.

"The Water Supply and Sanitation of Base Section No. 1 (St. Nazaire, France)," by John B. Hawley, consulting engineer, Fort Worth, Tex., formerly Major 503rd Engineers, Service Battalion, A. E. F., in charge. Illustrated by stereopticon.

"Army Camp Utilities," by W. L. Benham, Johnson and Benham, consulting engineers, Kansas City, Mo., formerly Major, M. M. C., in charge of Camp Utilities, Camp Funston, Kan.

"Water Supply and Sewerage Systems of Camps Meade and McClellan," by Morris Knowles and John M. Rice, chief engineer and division engineer, Morris Knowles, Inc., engineers, Pittsburg, Pa.

"The Acid Process of Sewage Treatment," by Edgar S. Dorr, engineer Sewer Service, Boston, Mass.

"The Psychological Influences of Public Improvements on the Minds of the People," by P. A. McCarthy, Lufkin, Tex.

"The Proposed National Department of Public Works," by W. B. Gregory, consulting engineer, Tulane University, New Orleans, La.

"Fairness in Specifications," by Alexander Potter, consulting engineer, New York.

THURSDAY, NOVEMBER 13, 1919.

Morning Session, 9 O'clock.

Report of Committee on Street Paving, Sidewalks and Street Design: W. A. Howell, chairman, Newark, N. J.

"Proper Sands and Aggregates for Cement Concrete Roads," by Duff A. Abrams, professor in charge of Structural Materials Research Laboratory, Lewis Institute, Chicago, Illinois.

"Recent Developments in Concrete Highway Construction," by A. N. Johnson, consulting highway engineer, Portland Cement Association, Chicago, Ill.

"Mineral Aggregates for Bituminous Pavements," by Wallace L. Caldwell, director of Departments of Roads and Pavements, Pittsburg Testing Laboratory, Birmingham, Ala.

"Some New Discoveries in Bituminous Pavement Construction," by A. E. Schutte, consulting chemist, Warren Brothers Company, Boston, Mass. Illustrated.

"Roads in France and America," by Edgar A. Kingsley, consulting engineer, San Antonio, Tex., formerly Major U. S. Engineers, Superintendent of Roads, Interior Section No. 2, A. E. F., France.

Report of Committee on Standard Tests for Bituminous Materials: A. H. Blanchard, chairman, Ann Arbor, Mich.

"The Economy of Brick Street and Road Construction," by Will P. Blair, vice-president of National Paving Brick Manufacturers' Association, Cleveland, O.

"Vertical Fiber Brick Pavements," by Clark R. Mandigo, consulting engineer, Western Paving Brick Manufacturers' Association, Kansas City, Mo. Illustrated.

"Brick vs. Block for Permanent Street Paving," by S. Cameron Corson, engineer, Norristown, Pa.

Afternoon, 1:30 O'clock.

Automobile ride through the city, leaving the Hotel Grunewald at 2 P. M., in which the following points of interest will be visited: Retail merchandising section, theatres, public squares, City Hall, parks, colleges, water purification plant, lake-shore parks, Art Museum, Old French Quarter, the Cabildo, Cathedral, Jackson Square, and various other points of interest.

Evening Session, 8 O'clock.

Report of Committee on Street Lighting, C. W. Koiner, chairman, Pasadena, Cal.

"Illuminations, Ancient and Modern, with Special Reference to Decorative Street Lighting," by W. D'A. Ryan, director of General Electric Illuminating Engineering Laboratory, Schenectady, N. Y. Illustrated with special slides in colors.

"Public Ownership of Utilities in Springfield," by Willis J. Spaulding, Commissioner of Public Property, Springfield, Ill.

Reports of Committees on Standard Specifications: Sheet Asphalt Pavement, Francis P. Smith, chairman, New York.

Bituminous Macadam, Bituminous Concrete and Asphalt Block Pavements, Morris R. Sherrerd, chairman, Newark, N. J.

Broken Stone and Gravel Roads, With or Without Bituminous Surface Treatment: Arthur H. Blanchard, chairman, Ann Arbor, Mich.

Brick Pavements: E. H. Christ, chairman, Grand Rapids, Mich.

Cement Concrete Pavements: William A. Hansell, Jr., chairman, Atlanta, Ga.

Stone Block Pavements: H. H. Smith, chairman, Brooklyn, N. Y.

Wood Block Pavements: E. R. Dutton, chairman, Minneapolis, Minn.

Sidewalks and Curbs: Sylverius Sammelman, chairman, St. Louis, Mo.

Sewers: Alexander Potter, chairman, New York City.

Foundations for Pavements: Special Committee, F. P. Smith, acting chairman.

FRIDAY, NOVEMBER 14, 1919.

Morning Session

Report of Committee on Traffic and Transportation, on Uniform Traffic Laws and Classification of Highways: R. Keith Compton, chairman, Baltimore, Md.

"A National Highway System and Its Relation to Traffic and Transportation," by S. M. Williams, Chairman Highways Industries Association and Federal Highway Council, Washington, D. C.

"Highway Traffic," by Frederick A. Reimer, county engineer, Newark, N. J.

Report of Committee on City Planning: Nelson P. Lewis, chairman, New York.

"Regional and Civic Planning as the Basis for Municipal Improvements," by Thomas Adams, Housing and Town Planning Adviser, Commission of Conservation, Ottawa, Canada.

"Lowland Farms Development, Youngstown, O.," by Morris Knowles, John M. Rice and E. O. Rose, Pittsburg, Pa.

"Report of Committee on Parks and Parkways," Harland Bartholomew, chairman, St. Louis, Mo.

"Architectural Design and Construction in St. Louis Parks," by Nelson Cunliff, Commissioner of Parks and Recreation, St. Louis, Mo. Illustrated.

Report of Committee on Resolutions.

Afternoon

Special arrangements are made for the members to break up into groups for trips to the various points of interest during the afternoon.

American Road Builders' Association.

The annual meeting of the American Road Builders' Association will be held Friday, Nov. 7, at the Automobile Club of America, 247 West 54th street, New York City.

The program for the morning session, beginning at 10.30 a. m. will be as follows:

Report of committee on "Uniform Highway Signs," chairman, Robert A. Meeker, consulting engineer, Newark, N. J.

Report of committee on "Convict Labor on Highway Work: Organization, Administration, Camps and Cost Data," chairman, G. P. Coleman, State Highway Commissioner of Virginia.

Report of committee on "Sources of Supply of Unskilled Labor for Highway Work," chairman, Paul D. Sargent, chief engineer, Maine State Highway Commission.

Report of committee on "Uniform High-Requirements for Highway Engineering Positions," chairman, H. G. Shirley, secretary, Highway Industries Association and Federal Highway Council.

Luncheon will be served in the grill-room of the club at 1 o'clock. Acceptances should be sent to secretary E. L. Powers, 150 Nassau Street, New York City.

The following will be the program for the afternoon session, beginning at 2.30 p. m.

Report of committee on "Economic Status of Guarantees for Pavements on Roads and Streets," chairman, Francis P. Smith, consulting paving engineer, New York City.

Report of committee on "Methods of Strengthening and Reconstructing Highway Bridges for Heavy Motor Truck Traffic," chairman, Willis Whited, bridge engineer, Pennsylvania State Highway Department.

Report of committee on "Reconstruction of Narrow Roadways of Trunk Highways with Adequate Foundations and Widths for Motor Truck Traffic," chairman, H. E. Breed, consulting engineer, New York City.

Discussion of the following resolution: Resolved: That Federal-Aid funds should be used only for the construction of trunk line roads and bridges of adequate width and strength. Discussion opened by Nelson P. Lewis, chief engineer, Board of Estimate and Apportionment of New York City.

Annual Reports of secretary, treasurer and board of directors. Election of 1919-1920 officers.

MUNICIPAL INDEX

(*Continued from page 232*)

Street Classification and Traffic Regulation. Editorial reference to article in this issue on street classification as aid to pavement design. 500 words. Municipal Journal and Public Works, Sept. 6, New York.

Fares

Zone-Mile System of the Public Service Railway. Full details are given of how the zones are laid out, how fares are collected, and how trainmen and public were educated to new plan. 24 ills., 4800 words. Electrical Railway Journal, Sept. 27, New York.

Zone Fares in Springfield. Are based on central city zone with outer zone belts and two reduced-rate tickets to points in first outside zone; pay-enter and pay-leave system of fare collection. 23 ills., 5300 words. Electric Railway Journal, Sept. 27, New York.

Zone Fares Found Satisfactory in Milwaukee. Few changes found necessary in this pioneer of the zone-fare system in this country; fare collection offers no difficulties; elasticity is an advantage. 12 ills., 4500 words. Electric Railway Journal, Sept. 27, New York.

Typical Zone Tickets from Abroad. Exhibits from Europe, Asia and South America show use of three general types; "duplex," "check-stub" and "fixed-amount, ride-limit." By F. C. Cusani, Milan, Italy. 24 ills., 1800 words. Electric Railway Journal, Sept. 6, New York.

Zone System in Portland. Maine Public Utilities Commission helps to solve fare problem; special tickets used for collection purposes; system works satisfactorily on all types of cars. 11 ills., 5300 words. Electric Railway Journal, Sept. 27, New York.

Discussion of Fare Systems. Present fare systems classified and compared; fundamentals of a scientific system outlined. 300 words. Electric Railway Journal, Sept. 27, New York.

Net Result of 5-Cent Fare. History of its effect on large company carried through three generations; lesson from this pointed out. By J. R. Bibbins, the Arnold Co., Chicago. 1 ill., 2000 words Electric Railway Journal, Sept. 20, New York.

Miscellaneous:

Contracts and Freight Rates. Contractors should protect themselves against increased cost which would follow an advance in freight rates. 660 words. Municipal Journal and Public Works, Sept. 20, New York.

Federal Commission Questionnaire. Federal Electric Railways Commission has issued a list of 168 questions on electric topics. 4500 words. Electric Railway Journal, Sept. 20, New York.

Electric Trucks and Tractors in the Iron and Steel Industry. Industrial electrical apparatus offers many advantages for use in smelting plants, foundries, etc.; handling problems of this industry; need for employing good operators. By B. J. Dillon. 3 ills., 2000 words. Electrical Review, Sept. 27, Chicago.

The Economic Limit to Motor Truck Weights. Continuation of article published in issue of Jan. 1, 1919. By R. C. Barnett, economic engr., Kansas City. 5 charts, 4600 words. Engineering and Contracting, Oct. 1, Chicago.

FIRE AND POLICE.

Card Index of Fire Hose. Used by Columbus, O., since two years. 150 words. Municipal Journal and Public Works, Sept. 6, New York.

New York Fire College Course. Fire streams, nozzles and hose lines. Care of fire hose; care of hose while not in use; pressure tests. (Continued.) 2000 words. Fire and Water Engineering, Sept. 3, New York.

New York Fire College Course. Fire streams, nozzles and hose lines; engineering experiments; resistance of stream of water. (Continued.) 3 charts, 2 tables, 1400 words. Fire and Water Engineering, Sept. 10, New York.

New York Fire College Course. Fire streams, nozzles and hose lines; high pressure systems. (To be continued.) 2 ills., 2000 words. Fire and Water Engineering, Sept. 17, New York.

New York Fire College Course. Fire Hydrants. Spacing hydrants; setting; high pressure hydrants in New York. 4 ills., 1600 words. Fire and Water Engineering, Sept. 24, New York.

New York Fire College Course. Fire Hydrants. Performance of the high-pressure system. (Continued). 2 ills., 900 words. Fire and Water Engineering, Oct. 1, New York.

Reduction of Insulation Resistance in High Pressure Fire Service Motors, Due to Moisture. 1500 words. Engineering and Contracting, Oct. 8, Chicago.

The Motor Fire Apparatus. A simple outline of its construction and maintenance. By C. B. Hayward, M. S. A. E. (Continued.) 2 ills., 1000 words. Fire and Water Engineering, Sept. 10, New York.

Motor Fire Apparatus. Simple outline of its construction and maintenance. By C. E. Hayward, M. S. A. E. 2000 words. Fire and Water Engineering, Sept. 17, New York.

Motor Fire Apparatus. A simple outline of its construction and maintenance. By C. B. Hayward, M. S. A. E. 1200 words. Fire and Water Engineering, Oct. 1, New York.

Private Fire Protection Service. Excerpts from final report of committee on private fire protection service of American Water Works Association; metering sprinkler connections; prevention of "bleeding." (Continued.) 2 ills., 3 tables. 1700 words. Fire and Water Engineering, Sept. 10, New York.

Private Fire Protection Service. Excerpts from final report of committee on private fire protection service of American Water Works Association; limit to size of private fire service connection. (Continued.) 2 ills., 1800 words. Fire and Water Engineering, Oct. 1, New York.

Albany Fire Alarm System. Description of up-to-date and complete system; provision made for future expansion; ample number of extra circuits arranged for. By Wm. B. Martin, supt., fire alarm telegraph, Albany fire dept. 1 ill., 1000 words. Fire and Water Engineering, Sept. 17, New York.

State Fire Marshals Meet in Toronto. Annual convention of Fire Marshals' Association of North America convenes in Canadian city; many papers of great interest read and discussed. 1 ill., 3000 words. Fire and Water Engineering, Sept. 10, New York.

Public Employment That Is a Public Trust. Editorial reference to the Boston police strike. 1000 words. Municipal Journal and Public Works, Sept. 20, New York.

GOVERNMENT AND FINANCE.

City Manager Plan Thrives Under Handicaps. By H. G. Otis, secy., City Managers' Ass'n. 700 words. American City, September, New York.

Change from Private to Municipal Ownership. Reference to pamphlet published by the consulting engineers, Burns & McDonnell, entitled "100 Reasons why 100 Cities Have Changd from Private to Municipal Ownership." 100 words. Municipal Journal and Public Works, Sept. 27, New York.

National Conference on Public Ownership League of America to be held in Chicago; subjects include railway, municipal electric light and power, water works, gas, telegraph and telephone, markets, mine, etc. 800 words. Municipal Journal and Public Works, Sept. 27, New York.

Utility Questions Among Most Important of Times. Chairman Higgins of Connecticut commission says private ownership with careful but general public regulation is preferable. 1200 words. Electrical World, Sept. 6, New York.

Common Errors in Municipal Finance. Crude financial legislation; lack of modern accounting methods; improper handling of bond issues; competitive buying. 1200 words. Engineering and Contracting, Sept. 24, Chicago.

Municipal Bond Sales Break the Record. More than 20 per cent higher than total for any previous similar period. 150 words. Municipal Journal and Public Works, Sept. 13, New York.

STRUCTURES AND MATERIALS.

Concrete:

Studies in Surface Area Proportioning Method. Discussion of R. B. Young's paper in June 26, 1919, issue of Canadian Engineer, surface area vs. fineness modulus; results of tests on bulking effect of moisture in sands. By L. N. Edwards, sr. highway bridge engr., U.S. Bureau of Public Roads. 4 charts, 2700 words. Canadian Engineer, Oct. 9, Toronto, Ont.

Effect of Vibration, Jigging and Pressure on Concrete. Results of tests made as part of experimental studies carried out through co-operation of Lewis Institute and Portland Cement Ass'n. By D. A. Abrams, prof., structural materials research laboratory, Lewis Institute, Chicago. 7 charts, 2800 words. Engineering and Contracting, Sept. 24, Chicago.

Concrete and Its Application to Municipal work. Recent development in system of reinforced concrete structure, used extensively by Port of London Authority; the "M. P." system of concrete structure. 1 ill., 1400 words. Municipal Engineering and Sanitary Record, Aug. 28, London, Eng.

Significance of Cracks in Reinforced Concrete Construction. Minor temperture cracks unimportant; causes of serious cracks; an Australian case; cracks foreseen by designers. By S. H. Harris, from proceedings of Royal Victorian Institute of Architects. 1800 words. Canadian Engineer, Sept. 25, Toronto, Ont.

Better Concrete: The Problem and Its Solution. Cement waste; causes of concrete disintegration; factors affecting formation of good concrete; composition of aggregate; photographic studies. Paper before the Engineers' Club of Philadelphia, by N. C. Johnson, consulting concrete engr. 15 ills., 7000 words. Journal of Engineers' Club of Philadelphia, September, Philadelphia.

Fine Grained Concrete Sands. Engineering division of University of Texas is planning systematic study of sands with reference to their value in concrete construction. By F. E. Giesecke, prof. architectural engrg., University of Texas. 1000 words. Canadian Engineer, Sept. 4, Toronto, Ont.

More Against Mortar for Concrete. Letter to editor referring to article in former issue entitled "Mortar Test Does not Insure Good Concrete Aggregate," from J. O. Jones, University of Kansas. 800 words. Engineering News-Record, Sept. 18, New York.

Further Researches in Rodding Concrete. Letter to the editor from F. E. Giesecke, prof. of architectural engrg. and head of div. of engrg., University of Texas. 2 ills., 800 words. Engineering News-Record, Sept. 11, New York.

Little Danger in Rich Concrete. Editorial reference to facts pointed out by various engineers in a symposium in this issue. 300 words. Engineering News-Record, Sept. 11, New York.

Compact Portable Outfit for Testing Aggregates in the Field. Description of apparatus; suggested methods of sampling; volumetric silt determinations. 1 ill., 2400 words. Engineering and Contracting, Oct. 1, Chicago.

Bridges:

Scamped Highway Bridges. Report of investigation made in Indiana shows that not one bridge or culvert examined was constructed according to plans and specifications. 900 words. Municipal Journal and Public Works, Sept. 20, New York.

(*Continued in next issue*)

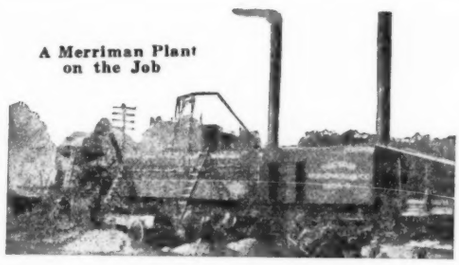
COLD PATCH

Maintenance Our Specialty
HEADLEY GOOD ROADS CO.
Franklin Trust Building
Philadelphia, Pa.

ASPHALT AND ROAD OIL

CUMMER PORTABLE ROAD ASPHALT PLANTS (3 UNITS)
750, 1250 and 1800 yard 2" sheet asphalt daily or other standard mixtures
Easy Capacity Over 100 in Operation
The F. D. Cummer & Son Co., Cleveland, Ohio

Loper Fire Alarm Company
STONINGTON, CONN.
Manufacturers of COMPRESSED AIR FIRE WHISTLES, WHISTLE BLOWERS, BELL STRIKERS, BOXES, GONGS, Etc., Etc.
ESTIMATES CHEERFULLY GIVEN.


A Merriman Plant on the Job

The car measures 55 feet over all. The plant is easy to dismantle and set up. Has extra large hot-material bin and large mixer. Two melting kettles—a day's run in each. Each unit can be operated separately.

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DEPARTMENT OF PUBLIC WORK & BUILDINGS
DIVISION OF HIGHWAYS
Springfield, Ill.
NOTICE OF ROAD WORK
BIDS TO BE RECEIVED NOVEMBER 12, 1919.

Sealed proposals will be received in the office of the Department of Public Works and Buildings, Division of Highways, Springfield, Illinois, until 10 A. M. November 12, 1919 for the road work designated below.

Plans for all work may be examined in the office of the Department of Public Works and Buildings, Division of Highways, Springfield, Illinois, and plans for the work in the several counties may be examined in the offices of the respective district engineers as shown below:

Vermilion County—R. L. Bell, Buchanan-Link Bldg., Paris, Ill.

LaSalle, Will and Grundy Counties—J. E. Huber, New Clifton Hotel Bldg., Ottawa, Ill.

LaSalle County—A. H. Hunter, 302 Apollo Theatre Bldg., Peoria, Ill.

Macoupin, Madison and Bond Counties—C. M. Slaymaker, 510 Metropolitan Bldg., E. St. Louis, Ill.

Except as noted, alternate bids will be received for the following types of construction: Portland cement concrete; monolithic brick (4 inch brick); monolithic brick (3 inch brick); bituminous concrete with binder course (specifications C1, C2, C3, or CT); bituminous concrete without binder course (specifications C1, C2, C3, or CT).

Route	County	Sec.	Width Feet	Approx. Length
Danville-Hoopeston Highway	Vermilion	R	8	25,600.
*Morris-Henry Highway	LaSalle	I	19&30	13,460.3
*Morris-Henry Highway	LaSalle	U	30	8,369.
Joliet-Morris Highway	Will	E	18	41,475.
Joliet-Morris Highway	Will-Grundy	F	18	29,676.
Joliet-Morris Highway	Grundy	G	18	40,109.3
Springfield-E. St. Louis Highw'y	Macoupin	S	16	25,415.
Springfield-E. St. Louis Highw'y	Macoupin	T	16	15,830.
Springfield-E. St. Louis Highw'y	Macoupin	V	16	21,235.
National Highway	Madison	33	16&18	19,762.3
National Highway	Bond	34	16	19,307.
National Highway	Bond	35	16	23,864.7
National Highway	Bond	36	16&18	20,223.

*Earth road.

Cement will be furnished on all sections by the State or by the County.

By order of
The Department of Public Works & Bldgs.,
Frank I. Bennett, Director.

E. M. F.

S. E. BRADT,
Supt. of Highways.
CLIFFORD OLDER,
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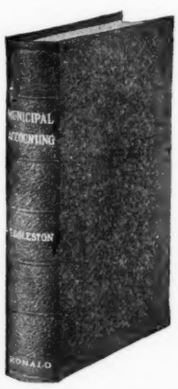

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF MUNICIPAL JOURNAL AND PUBLIC WORKS, PUBLISHED WEEKLY AT NEW YORK, N. Y., FOR OCTOBER, 1, 1919.

State of New York, County of New York. Before me, a Notary Public in and for the State and county aforesaid, personally appeared James T. Morris, who, having been duly sworn according to law, deposes and says that he is the business manager of the Municipal Journal and Public Works, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and, if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Publisher—Municipal Journal and Engineer, 243 West 39th Street, New York City.

Editor—A. Prescott Folwell, Montclair, N. J.

Managing Editor—A. Prescott Folwell.

Business Manager—James T. Morris, White Plains. N.Y.

2. That the owners are: (Give names and addresses of individual owners, or, if corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

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3. That the known bondholders, mortgages and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

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4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is. . . . . (This information is required from daily publications only.)

JAMES T. MORRIS
Business Manager.

Sworn to and subscribed before me this 14th day of October, 1919.

(Seal) H. H. MINER.
Notary Public, New York Co., 176.
(My commission expires March 30, 1920.)

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FRANK TALBOTT, Secretary.